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CONTENTS

V. A. C. HENMON. *The Measurement of Ability in Latin. Part I. Vocabulary* 515

C. B. CORNELL. *A Graduated Scale for Determining Mental Age* 539

JOSEPH ZIMMERMAN. *The Binet-Simon Scale and the Yerkes Point Scale: A Comparative Study Based on the Examination of 100 Cases* 551

SAMUEL C. KOHS. *An Annotated Bibliography of Recent Literature on the Binet-Simon Scale (1913–1917). Part III* 559

EDITORIAL 566

NOTES AND NEWS 568

PUBLICATIONS RECEIVED 570

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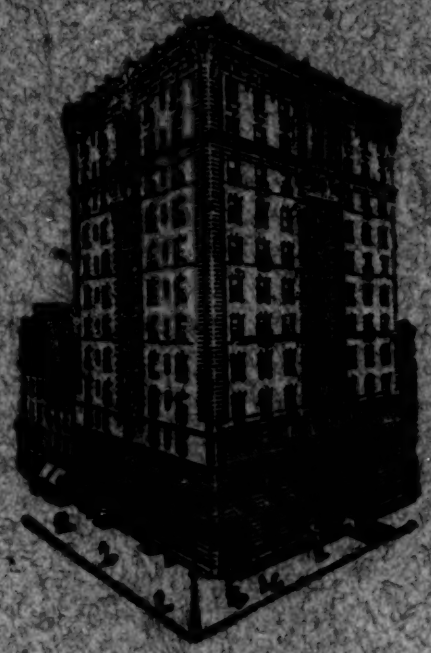

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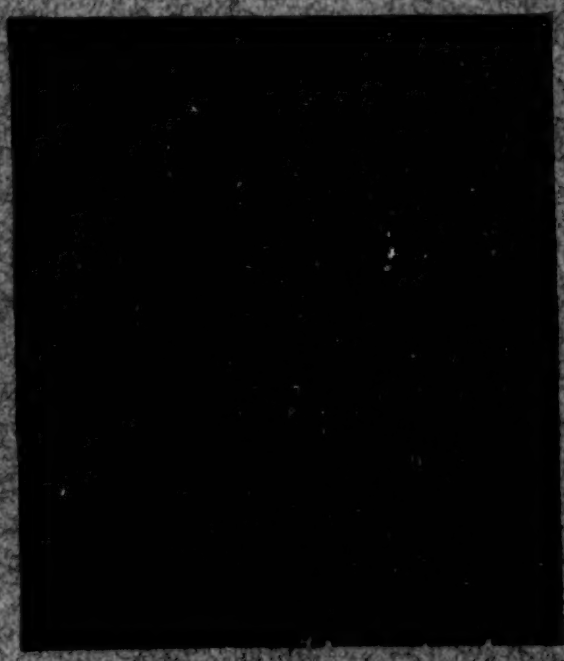

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VOLMME VIII NOVEMBER, 1917 NUMBER 9

THE JOURNAL OF EDUCATIONAL PSYCHOLOGY

THE MEASUREMENT OF ABILITY IN LATIN. PART I. VOCABULARY

V. A. C. HENMON.

The University of Wisconsin

A recent writer[1] on the psychology of language instruction points out the diversity of opinion and the uncertainty which prevail in this field. The reasons for this state of affairs are not far to seek. Problems that arise are solved on a basis of mere opinion or of practical experimentation which is unreliable, ambiguous and unconvincing. Flagstad rightly maintains that the great need is an exact scale for the measurement of results of instruction, which will make possible reliable quantitative comparisons. While many would recognize the desirability of such a scale, the great majority perhaps would question the possibility of its construction. The results to be given in this study represent an attempt to secure such a scale.

Ability in a foreign language may be indicated in three main ways: (1) Scope and accuracy of vocabulary; (2) Ability to understand connected discourse in a foreign language, or, rate and accuracy of translating from a foreign language to the mother tongue, or, from the mother tongue to the foreign language; (3) Knowledge of grammar, syntax, and word derivation. Each or all of these abilities are available for purposes of measurement and are capable of measurement. The present paper will report work done to measure ability in Latin in one of these directions. It will give results from two vocabulary tests—an "Easy Vocabulary Test" (for first-year Latin pupils), and what I shall call "A Standard Vocabulary Test." A subsequent paper will

[1] FLAGSTAD, CHR. B. *Psychologie der Sprachpädagogik.* Leipzig und Berlin, 1913, Vorwort, s. v.

report a study of ability to translate as measured by a sentence test based upon the Standard Vocabulary. Similar studies of ability in German are in progress. For coöperation and assistance in developing these tests I am indebted to many teachers of Latin the country over, the list of which is too long to be given here. I am under especial obligations to Mr. H. A. Brown, Director of the Bureau of Research, Department of Public Instruction, Concord, New Hampshire, and to Dr. Walter S. Monroe, Director of the Bureau of Educational Measurements and Standards, Kansas State Normal School, Emporia, Kansas, for providing an opportunity to give the tests in New Hampshire and Kansas, respectively. Without the interested coöperation of Latin teachers, such a study as this would be impossible.

Easy Vocabulary Test

The most obvious evidence of ability and progress in Latin is in the number of Latin words whose meanings are known or whose equivalents in English can be given. Other things being equal, then, the pupil that makes the best score in a vocabulary test will show the highest ability in Latin or will have made the most progress. The essential difficulty in the construction of satisfactory tests lies in the selection of the words to be used. If results are to be comparable beyond the limits of a single class or of classes using the same texts, they should necessarily be such as the pupil has come in contact with and might reasonably be expected to know. The variety of first year texts and the great variation in vocabularies, in spite of the growing tendency to make the first year book introductory to Caesar, and to select the vocabulary from Caesar, make the determination of a satisfactory list of words difficult. Preliminary experimentation begun five years ago was based on a hundred words, fifty in Latin and fifty in English. These words were found to be common to four first-year books, widely used, according to the testimony of Latin teachers; namely, the first-year texts of Collar and Daniell, D'Ooge, Pearson, and Smith and Laing. Subsequent study showed that these words are, with few exceptions, common to twelve of the most recent or commonly used first-year texts. Following is a list of these words as they were given:

Latin Vocabulary Test

1.

1. adventus
2. caput
3. cur
4. dominus
5. pilum
6. auxilium
7. civis
8. de
9. equitatus
10. finis
11. fugio
12. gero
13. homo
14. ignis
15. proelium
16. incolo
17. pedes
18. impetus
19. ad
20. domus
21. pulcher
22. inter
23. diu
24. conficio
25. ante
26. interficio
27. legatus
28. magister
29. laboro
30. mille
31. parvus
32. malus
33. neque
34. maneo
35. omnis
36. maximus
37. primus
38. maior
39. par
40. oppugno
41. post
42. relinquo
43. supero
44. trans
45. occido
46. sequor
47. recipio
48. venio
49. vinco
50. proximus

2.

1. farmer
2. high
3. camp
4. speed
5. abundance
6. leader
7. I give
8. the other
9. horse
10. flight
11. I hear
12. sword
13. good
14. dear
15. horseman
16. grain
17. son
18. I throw
19. place (N)
20. king
21. I see
22. easy
23. I order
24. I say
25. war
26. broad
27. hand
28. free
29. much (adj.)
30. I praise
31. better (adj.)
32. I fortify
33. sailor
34. hostage
35. gate
36. foot
37. smaller
38. ship
39. girl
40. through
41. forest
42. always
43. without
44. I hold
45. city
46. life
47. I make
48. I wound
49. more
50. I call

The lists were given in June to 252 first-year pupils in ten schools, the Latin list first and then the English list. The time required varied from three to fifteen minutes. The results for the different schools in terms of the median number of words correct are indicated in the following table.

TABLE I.

Latin Vocabulary Test—100 Words

Median Scores for 252 First Year Pupils in 10 Schools

School	Latin–English	English–Latin
A	45	41
B	44	37
C	41.5	34.5
D	41.5	31.5
E	41	36
F	41	32
G	36	33.5
H	34	34
I	34	29
J	21	19
Median	41.5	35

The striking thing about this table is the great variation shown in the first year classes in ten very good high schools from a score of 45 or 90 percent correct to 21 or 42 percent correct in the Latin-English list, and from 41 or 82 percent to 19 or 38 percent in the English-Latin list. Such variability has frequently been shown in recent years with the application of standard tests and scales and needs no special comment. One is led to wonder, however, at the character and worth of the instruction in Latin where after a year's work 17 pupils on the average missed 29 out of 50 words as easy as those in the Latin-English list.

The distribution of the 252 pupils in each of the tests is indicated in Figs. 1 and 2.

The teachers were requested to mark on the papers the final grade in Latin for the year. In order to determine the validity and value of a vocabulary test as a measure of ability and progress the correlations between performances in the tests and the final grade were calculated for eight schools. Correlations were also determined between the performances in the two tests. These results appear in Table II.

TABLE II.

School	No. of Pupils	Latin–English and Marks	English–Latin and Marks	Latin–English and English–Latin
A	71	.64	.49	.82
B	44	.48	.52	.83
C	36	.59	.75	.92
D	17	.61	.77	.75
E	28	.26	.67	.88
F	7	.26	.68	.94
G	22	.77	.51	.49
H	11	.83	.90	.94
	Average	.56	.66	.82

LATIN VOCABULARY TEST

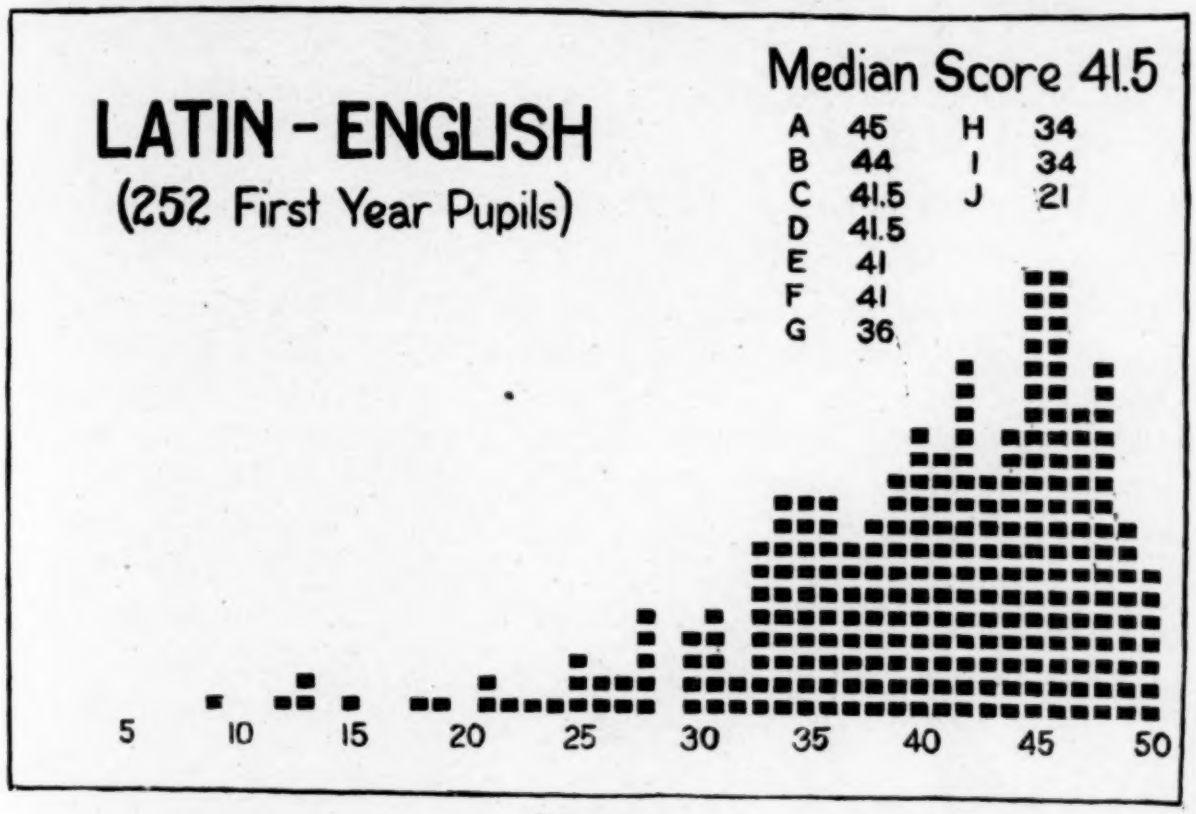

FIGURE I

LATIN VOCABULARY TEST

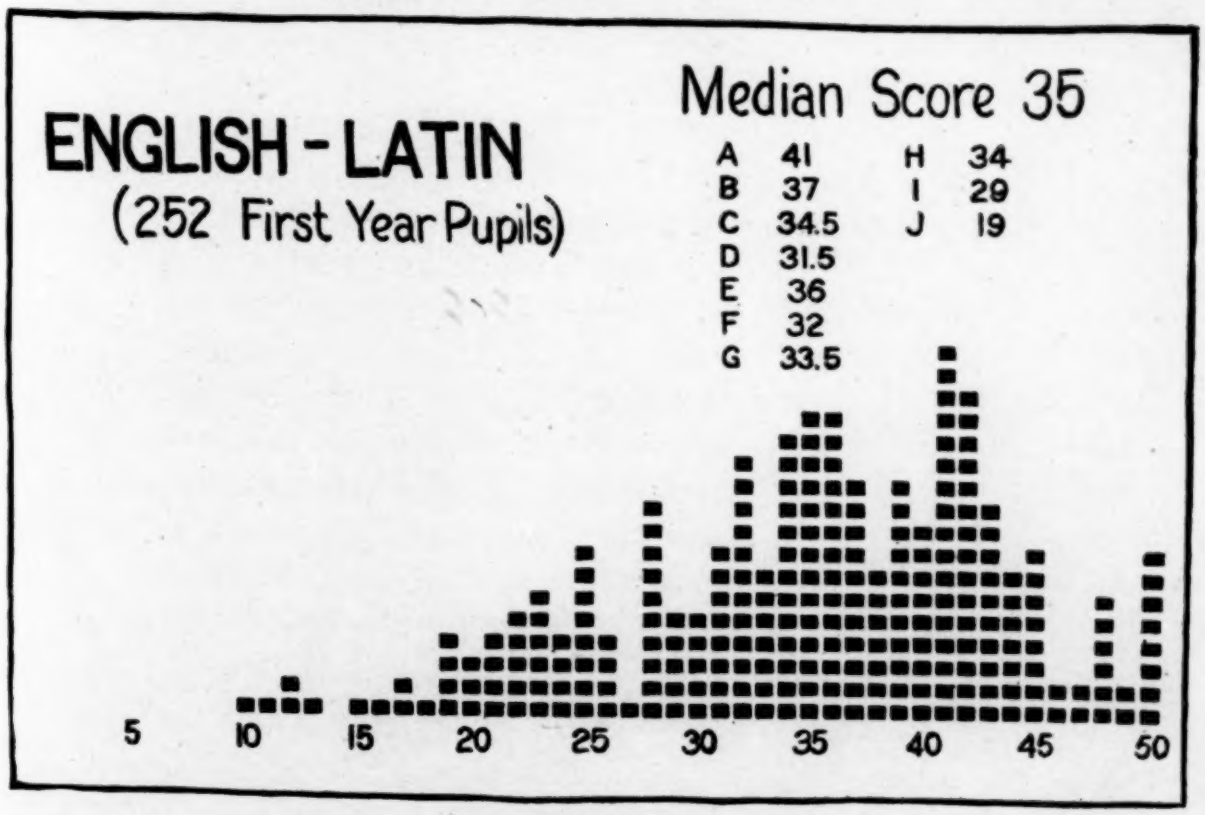

FIGURE II

The correlations, except in two instances, show a tolerably close agreement between scores and teachers estimates and indicate the usefulness of the tests in rating pupils. The correlations between the two tests are very high and show that either test could be used alone without much error.

Arrangement of Words in Order of Difficulty and the Determination of Scale Values

The scores and correlations above have been determined on the supposition that all of the words are of equal difficulty, which is obviously not true. In scoring a test such as this allowance should be made somehow for the fact that in the same list *pulcher* was correctly given by 99 percent of the 252 pupils while *omnis* was correctly given by 87 percent and *pedes* by 55 percent. To give these words equal values is of course inaccurate. A scale value for each word was determined by the method used by Buckingham,[2] in scaling words for spelling. At first blush it might appear as if the values could be determined directly from the percentages of times a word was translated correctly but this fails to take into account the form of distribution of mental abilities. Assuming that ability in translating these words follows the normal distribution then the difference of 2 percent between words remote from the median in the curve of distribution, such as *trans* 95 percent correct and *legatus* 93 percent is not the same as the difference between *par* 64 percent correct and *occido* 62 percent correct, though in both pairs the difference is 2 percent. On the assumption of the normal distribution the difference in difficulty between *trans* and *legatus* is about three times as great as that between *par* and *occido*. Pupils so poor in the knowledge of Latin after a year's work as to miss *trans* and *legatus* are far less numerous than those who would miss *par* and *occido*. The percentages of times each word is translated correctly being known, it is possible to locate the 50 words on the base line of a normal frequency surface in terms of the probable error equivalents of these percentages. In order to have a point of reference which would represent an approximation to a zero point in ability, a word, if there were one, so easy that it would be missed by but 5 out of 1000 first year pupils, was arbitrarily

[2] Buckingham, B. R. *Spelling Ability—Its Measurement and Distribution.* Columbia University Contributions to Education, New York, 1913.

taken as a point of reference. This point will be found to be 3.8 times the probable error below the median. A word so difficult that it would be given correctly by but 5 out of 1000 pupils would be located at a point 3.8 P. E. above the median. If the 3.8 P. E. is taken as the zero point then the more difficult word would have a value of 7.6. On such a scale the easiest word in the list, *pulcher*, would have a value of .3 while the most difficult would have a value of 5.2. Tables IV and V give the list of words in order of difficulty, the number of times each word was correctly translated, the percent of times correct, and the corresponding P. E. values subtracted from 3.8 P. E.

The two lists may be used by teachers and supervisors in testing first-year pupils in various ways:

1. The lists may be given as they stand without reference to variation in difficulty of the words, *i. e.*, without reference to the scale values. Comparisons may be made with the scores obtained in ten schools as shown in Table I.

2. The lists may be given as they are and the appropriate values or weights may be assigned to each word in scoring the results. The giving of varying weights to different examination questions is a familiar practice among teachers. The weights given in such cases are based merely on the teacher's judgment as to the amount of credit to be given. The weights assigned here have been scientifically determined on a basis of actual pupil performance in a sufficiently large number of cases to possess a very considerable reliability. A perfect score in the Latin-English list would be 125.5 points. Toward this score the pupil would be given 1.4 points for correctly translating *domus*, 2.8 points for *interficio*, and 3.6 points for *pedes*. Such scoring would be far more equitable than to give each word the same value.

3. A smaller list of words differing in difficulty by equal steps may be selected. For ready comparison, of a large number of schools and pupils such a list would be useful. A ten-word list of this nature would be *proelium*, 1.2, *magister*, 1.5, *ante*, 1.8, *de*, 2.1, *ignis*, 2.4, *dominus*, 2.7, *recipio*, 3.0, *par*, 3.3, *pedes*, 3.6, *incolo*, 4.1.

4. A smaller list, say of 20 words, *caput* to *recipio*, where the differences in values are so small that they can be neglected without great error would be useful for many testing purposes and simplify the problem of scoring.

TABLE IV.

Latin–English Words in Order of Difficulty and Their P. E. Values Subtracted from 3.8 P. E.

		No. Cor.	Percent Cor.	Scale Value
1.	pulcher	250	.99	0.3
2.	parvus	244	.97	1.1
3.	proelium	241	.96	1.2
4.	laboro	240	.95	1.4
5.	trans	239	.95	1.4
6.	domus	239	.95	1.4
7.	magister	236	.94	1.5
8.	legatus	234	.93	1.6
9.	auxilium	233	.92	1.7
10.	malus	230	.91	1.8
11.	ante	230	.91	1.8
12.	venio	230	.91	1.8
13.	ad	229	.91	1.8
14.	primus	227	.90	1.9
15.	post	225	.89	2.0
16.	caput	224	.89	2.0
17.	finis	222	.88	2.1
18.	de	220	.87	2.1
19.	omnis	220	.87	2.1
20.	inter	216	.86	2.2
21.	mille	214	.85	2.3
22.	oppugno	214	.85	2.3
23.	civis	212	.85	2.3
24.	cur	211	.84	2.3
25.	fugio	211	.84	2.3
26.	ignis	210	.83	2.4
27.	equitatus	199	.79	2.6
28.	maximus	198	.78	2.6
29.	homo	196	.77	2.7
30.	dominus	194	.77	2.7
31.	interficio	189	.75	2.8
32.	gero	187	.74	2.8
33.	vinco	181	.72	2.9
34.	neque	181	.72	2.9
35.	recipio	175	.69	3.0
36.	relinquo	170	.67	3.1
37.	impetus	170	.67	3.1
38.	sequor	168	.67	3.2
39.	pilum	167	.66	3.2
40.	diu	165	.65	3.2
41.	par	162	.64	3.3
42.	adventus	160	.63	3.3
43.	supero	159	.63	3.3
44.	occido	157	.62	3.3
45.	maior	142	.56	3.6
46.	pedes	139	.55	3.6
47.	maneo	135	.53	3.7
48.	incolo	102	.40	4.1
49.	proximus	95	.38	4.2
50.	conficio	42	.17	5.2
				125.5

TABLE V.

English–Latin Words in Order of Difficulty and Their P. E. Values Subtracted from 3.8 P. E.

		No. Cor.	Percent Cor.	Scale Value
1.	farmer	244	.97	1.1
2.	girl	236	.93	1.6
3.	good	234	.92	1.7
4.	king	233	.92	1.7
5.	war	232	.92	1.7
6.	I see	229	.91	1.8
7.	I hear	228	.90	1.9
8.	I praise	216	.86	2.2
9.	I call	216	.85	2.3
10.	sailor	215	.85	2.3
11.	I make	213	.84	2.3
12.	camp	210	.83	2.3
13.	son	208	.82	2.4
14.	leader	207	.82	2.4
15.	I give	207	.82	2.4
16.	high	206	.82	2.5
17.	city	203	.80	2.6
18.	hand	201	.80	2.6
19.	I order	199	.79	2.6
20.	forest	195	.77	2.7
21.	I wound	194	.77	2.7
22.	I say	194	.77	2.7
23.	horse	194	.77	2.7
24.	dear	192	.76	2.8
25.	grain	183	.73	2.9
26.	gate	182	.72	2.9
27.	sword	174	.69	3.0
28.	much (adj.)	169	.67	3.1
29.	broad	166	.66	3.2
30.	better (adj.)	160	.64	3.3
31.	place (N)	159	.63	3.3
32.	I fortify	158	.63	3.3
33.	through	157	.62	3.3
34.	free	153	.61	3.3
35.	foot	147	.58*	3.5
36.	easy	143	.57	3.5
37.	I hold	141	.56	3.6
38.	I throw	137	.55	3.6
39.	ship	133	.53	3.7
40.	always	133	.53	3.7
41.	like	132	.52	3.7
42.	abundance	132	.52	3.7
43.	flight	123	.49	3.8
44.	more	119	.47	3.9
45.	without	113	.44	4.0
46.	smaller	104	.41	4.1
47.	hostage	91	.36	4.3
48.	horseman	91	.36	4.3
49.	the other	89	.35	4.3
50.	speed	74	.29	4.6
				147.9

Standard Vocabulary Test

Experience with the hundred words reported above had seemed to show the value of a vocabulary test for many purposes—the rating of pupils, comparison of schools and teachers, a study of methods, etc.; hence, a further study of vocabularies was made. This was done partly to secure a larger list of words and partly because of the fact that occasionally teachers returned the first year lists with certain words marked as not occurring in the texts which they used. In order to overcome this difficulty and to secure a true standard vocabulary a tabulation was made of all the words occurring in thirteen recent or widely used beginners' books. The vocabularies in these books ranged from 750 to 1750 words. The total number of different words found in all the books was 3350. Of these 319 were common to all the books. Using Lodge's[3] tabulation of all the words used in Caesar, Cicero, and Vergil, and their frequency of occurrence, all of the words of the 319 that are not used by all three of these authors were dropped. This reduced the list to the 239 words which form the basis of this study. This list of words would seem to be in the real sense a standard vocabulary for high school Latin. While the words will vary in frequency of use in the different books, all pupils, no matter what books are used, will have come in contact with them in their first year and will continue in contact with them throughout the four years of high school Latin.

Blanks containing the words arranged in alphabetic order were printed and have been used for various purposes during the past two years in a considerable number of schools. In the interest of economizing space in this article the blank is not reproduced. The list appears in Table VII below. For the information of Latin teachers and students of education the 80 words, which were dropped on the ground that they did not appear in Caesar, Cicero, and Vergil, are worth publishing. They are the following:

acriter	intellego	pons
agmen	interficio	porto
amicitia	iste	prope
animal	itaque	provincia
bene	legatus	proximus
captivus	legio	quidam

[3] Lodge, Gonzalez. *The Vocabulary of High School Latin.* Columbia University Contributions to Education, New York, 1907.

celeritas	liber	quinque
celeriter	liberi	quo
civitas	libero	reliquus
collis	magis	ripa
convoco	maxime	septem
cornu	minor	septimus
decimus	minus	sex
dissimilis	mons	silva
ducenti	moror	statim
duodecim	multitudo	sub
equitatus	natura	summus
equus	nolo	superior
expugno	numen	sustineo
facile	obses	trans
filia	oppidum	transeo
flumen	optimus	ultimus
fortiter	passus	uter
fossa	persuadeo	vester
frumentum	pes	viginti
gladius	plurimus	vulnero
incolo	plus	

Results with the 239 words in terms of the averages and median numbers correct from 19 schools in three states appear in Table VI. The table gives both the averages and medians for the convenience of teachers or principals who may wish to use one or the other measure of central tendencies. The distribution is skewed and the medians and averages, it will be noted, not only do not coincide except in a few cases, but in some cases the difference is considerable. The average number correct for second year pupils, *e. g.*, is 187 while the median is 195. Exceptionally poor or exceptionally good pupils in a class will produce discrepancies in the two measures.

As in the first year test the striking thing is the wide variation in schools, *e. g.*, in the first year the range from a median of 56 in one school to 209 in another. It is noteworthy that even fourth-year pupils fall short, by a considerable amount, of a perfect score with this easy vocabulary.

Arrangement of Words in Order of Difficulty and the Determination of Scale Values

The averages and medians in Table VI were obtained simply by scoring the number of words correct, regardless of the variation in the difficulty of the words. The main purpose of this study has been to determine first the weights or values to be assigned to each word for each year and finally a general or average scale value for all four years. The essential information

TABLE VI.

Results from Nineteen Schools

School	Averages				School	Medians				School	No. of Pupils			
	I	II	III	IV		I	II	III	IV		I	II	III	IV
A	178	212	225	227	A	175	209	226	227	A	15	14	9	8
B	172	202	215	223	B	172	200	215	229	B	58	37	10	10
C	140	185	215	216	C	144	195	217	217	C	35	20	13	7
D	146	165	207	198	D	149	169	211	205	D	32	31	18	8
E	123	154	160	179	E	123	159	160	184	E	26	37	2	7
F	108	187	192	...	F	110	183	193	...	F	9	8	6	..
G	170	203	...	...	G	170	210	...	...	G	48	24	..	..
H	78	173	190	202	H	56	162	191	208	H	5	5	6	3
I	170	201	222	225	I	173	202	222	223	I	9	3	2	3
J	149	196	222	221	J	152	209	222	218	J	23	9	2	5
K	133	199	220	223	K	136	204	221	225	K	23	19	5	8
L	117	168	205	206	L	115	168	203	208	L	9	12	5	4
M	145	175	206	223	M	149	182	200	224	M	12	10	14	8
N	172	179	205	209	N	174	174	207	216	N	25	17	12	7
O	201	215	220	224	O	209	219	222	225	O	19	18	8	9
P	144	210	216	217	P	150	209	215	217	P	9	4	3	2
Q	...	199	...	...	Q	...	199	...	...	Q	..	9	..	..
R	...	191	...	...	R	...	198	...	...	R	..	6	..	..
S	...	...	...	199	S	...	...	...	199	S	..	..	..	2
Av.	155	187	209	214	Med.	157	195	213	218	Total	357	283	115	92

and the results obtained are found in Table VII which gives the percent. of times each word was correct in each year, the corresponding P. E. values subtracted from the assumed zero point (—3.8 P. E.) and the final scale value. The 39 words that are starred include those which are troublesome to score such as *eo, multus, ne, quod,* those where an English equivalent which must be accepted as correct, is obvious, such as *committo, contendo, causa, consul, in,* and those that are so easy as not to be missed at all by third and fourth year pupils, such as *bonus, magnus, pater* and *sed.* In scoring the words the low percentages correct for *constituo, confero, contineo, infero, multus* and *trado* are due to the fact that *I constitute, I confer, I continue, I infer, many,* and *I trade* were scored as incorrect. These words are among those starred for omission. These are the only ones the scoring of which calls for especial comment here.

TABLE VII.

	Percents Correct				Year Scale Values				Genl. Scale Values
	I	II	III	IV	I	II	III	IV	
ab	92.7	97.5	97.3	98.9	1.6	.9	.9	.4	1.0
acer	73.3	68.8	86.0	93.5	2.9	3.1	2.2	1.6	2.4
accipio	66.6	79.1	88.6	94.6	3.2	2.6	2.0	1.4	2.3
acies	48.1	80.1	85.2	88.0	3.9	2.6	2.3	2.0	2.7
ad	91.8	96.4	95.6	97.8	1.7	1.1	1.3	.8	1.2
adventus	47.0	81.9	90.4	95.7	3.9	2.4	1.9	1.3	2.4
ager	83.5	82.2	80.8	72.8	2.4	2.4	2.5	2.9	2.5
aliquis	40.9	47.3	73.9	75.0	4.1	3.9	2.8	2.8	3.4
alius	52.9	63.9	71.3	72.8	3.7	3.3	3.0	2.9	3.2
alter	38.4	55.1	69.5	75.0	4.2	3.6	3.0	2.8	3.4
altus	72.2	71.7	86.0	94.6	2.9	2.9	2.2	1.4	2.4
amicus	91.8	96.0	96.5	97.8	1.7	1.2	1.1	.8	1.2
*amitto	36.1	65.7	79.9	85.7	4.3	3.2	2.6	2.2	3.1
animus	48.1	79.1	99.1	96.7	3.9	2.6	.3	1.1	2.0
annus	90.2	95.0	100.	98.9	1.9	1.4	0	.4	.9
ante	84.0	95.0	99.1	98.9	2.3	1.4	.3	.4	1.1
appello	36.1	77.7	89.5	93.5	4.3	2.7	1.9	1.6	2.6
apud	60.5	87.8	88.6	96.7	3.4	2.1	2.0	1.1	2.1
*arma	87.4	92.2	91.2	96.7	2.1	1.7	1.8	1.1	1.7
atque	64.7	90.1	97.3	98.9	3.2	1.9	.9	.4	1.6
audio	95.8	97.2	97.3	98.9	1.2	1.0	.9	.4	.9
auxilium	91.3	97.2	100.	98.9	1.8	1.0	0	.4	.8
bellum	97.8	98.9	100.	98.9	.8	.4	0	.4	.4
*bonus	99.1	98.6	99.1	100.	.3	.5	.3	0	.3
capio	87.6	92.9	97.3	97.8	2.1	1.6	.9	.8	1.4
caput	74.2	78.7	91.2	95.7	2.8	2.6	1.8	1.3	2.1
castra	94.4	98.6	100.	100.	1.3	.5	0	0	.5
*causa	87.4	96.1	99.1	98.9	2.1	1.2	.3	.4	1.0
celer	68.3	69.3	79.9	84.8	3.1	3.1	2.6	2.3	2.7
centum	69.2	88.3	94.7	97.8	3.1	2.0	1.4	.8	1.8
certus	32.8	66.9	84.3	89.1	4.5	3.2	2.3	2.0	3.0
cognosco	60.8	93.3	98.2	97.8	3.4	1.6	.7	.8	1.6
*committo	56.0	66.4	71.3	75.0	3.6	3.2	3.0	2.8	3.1
*confero	29.4	60.1	66.9	64.1	4.6	3.4	3.2	3.3	3.6
conficio	14.3	38.5	57.4	68.4	5.4	4.2	3.5	3.1	4.1
conicio	11.5	60.8	68.7	79.3	5.6	3.4	3.1	2.6	3.7
consilium	58.2	85.5	86.0	89.1	3.1	2.2	2.2	2.0	2.4
*constituo	25.2	74.2	82.6	87.0	4.8	2.8	2.4	2.1	3.0
*consul	90.2	89.5	94.7	93.5	1.9	1.9	1.4	1.6	1.7
*contendo	72.0	87.3	95.6	95.7	2.9	2.1	1.3	1.3	1.9
*contineo	28.8	51.0	52.1	52.2	4.6	3.8	3.7	3.7	4.0
convenio	45.1	72.1	73.0	87.0	4.0	2.9	2.9	2.1	3.0
*copia	65.8	64.3	71.3	67.4	3.2	3.3	3.0	3.1	3.1
corpus	76.4	86.6	97.3	98.9	2.7	2.2	.9	.4	1.6
cum	98.3	99.3	99.1	98.9	.7	.2	.3	.4	.4
cur	62.2	70.3	92.1	94.6	3.3	3.0	1.7	1.4	2.4
de	85.1	85.5	99.1	98.9	2.3	2.2	.3	.4	1.3
debeo	42.3	42.1	75.6	79.3	4.1	4.1	2.8	2.6	3.4

TABLE VII.—Continued

	Percents Correct				Year Scale Values				Genl. Scale Values
	I	II	III	IV	I	II	III	IV	
decem	94.4	97.5	97.3	97.8	1.4	.9	.9	.8	1.0
*defendo	96.3	98.5	100.	98.9	1.2	.5	.0	.4	.5
deligo	17.9	52.6	69.5	79.3	5.2	3.7	3.0	2.6	3.6
deus	79.5	86.2	94.7	100.	2.6	2.2	1.4	.0	1.5
dico	82.3	96.8	99.1	98.9	2.4	1.1	.3	.4	1.0
dies	87.6	92.9	96.5	94.6	2.1	1.6	1.1	1.4	1.5
difficilis	87.6	85.5	87.8	95.7	2.1	2.2	2.1	1.3	1.9
discedo	27.4	51.9	54.7	71.7	4.7	3.7	3.6	2.9	3.7
diu	52.1	58.3	69.5	84.8	3.7	3.5	3.0	2.3	3.1
do	87.6	91.2	93.0	93.5	2.1	1.8	1.6	1.6	1.8
*domus	92.4	97.2	100.	100.	1.7	1.0	.0	.0	.7
duco	91.8	97.9	100.	98.9	1.7	.8	.0	.4	.7
dum	19.3	69.3	81.7	93.5	5.1	3.1	2.5	1.6	3.0
duo	90.4	95.7	99.1	100.	1.9	1.3	.3	.0	.9
dux	84.6	93.3	99.1	97.8	2.3	1.6	.3	.8	1.2
educo	51.8	86.1	90.4	95.7	3.7	2.2	1.9	1.3	2.3
ego	82.0	73.9	94.7	95.7	2.4	2.9	1.4	1.3	2.0
*eo	51.5	67.1	73.0	78.3	3.7	3.1	2.9	2.6	3.1
eques	37.5	37.5	53.0	47.8	4.3	4.3	3.7	3.9	4.0
*et	98.8	98.9	100.	100.	.5	.4	.0	.0	.2
etiam	43.1	78.4	84.3	85.7	4.6	2.6	2.3	2.2	2.8
ex	93.0	98.8	100.	100.	1.6	.4	0	0	.5
exercitus	82.6	96.1	97.3	92.4	2.4	1.2	.9	1.7	1.6
*extremus	70.8	86.5	88.6	96.7	3.0	2.2	2.0	1.1	2.1
facilis	80.6	78.0	81.7	92.4	2.5	2.7	2.5	1.7	2.3
facio	88.8	97.8	97.3	100.	2.0	.8	.9	0	.9
fero	43.1	73.8	91.2	92.4	4.1	2.9	1.8	1.7	2.6
fides	48.2	72.4	85.2	89.1	3.9	2.9	2.3	2.0	2.7
filius	79.2	79.1	93.0	95.7	2.6	2.6	1.6	1.3	2.0
finis	89.9	92.1	100.	98.9	1.9	1.7	0	.4	1.0
*finitimus	34.4	46.6	53.9	51.0	4.4	3.9	3.7	3.8	3.9
fio	27.2	45.2	46.1	56.5	4.7	4.0	3.9	3.6	4.0
fortis	81.5	84.0	95.6	93.5	2.5	2.3	1.3	1.6	1.9
*fortuna	90.4	98.5	100.	96.7	1.9	.5	0	1.1	.9
*frater	87.9	93.9	99.1	100.	2.1	1.5	.3	0	1.0
fuga	56.8	77.3	86.9	88.0	3.5	2.7	2.1	2.1	2.6
gero	77.6	90.0	94.7	94.6	2.7	1.9	1.4	1.4	1.8
gratia	28.8	41.7	73.9	70.7	4.2	4.1	2.9	3.0	3.5
gravis	74.8	79.8	96.5	95.7	2.8	2.6	1.1	1.3	1.9
habeo	89.6	97.8	98.2	98.9	1.9	.8	.7	.4	1.0
hic	86.5	87.9	92.1	95.7	2.2	2.1	1.7	1.3	1.8
homo	82.0	88.6	95.6	96.7	2.4	2.0	1.3	1.1	1.7
hostis	96.3	98.5	100.	97.8	1.2	.5	0	.8	.6
humilis	42.8	42.7	66.9	66.3	4.1	4.1	3.2	3.2	3.6
iam	50.4	67.1	91.2	93.5	3.8	3.1	1.8	1.6	2.6
ibi	51.2	68.5	73.0	75.0	3.8	3.1	2.9	2.8	3.1
idem	43.7	71.3	92.1	87.0	4.0	3.0	1.7	2.1	2.7
ignis	76.2	87.2	93.0	95.7	2.7	2.1	1.6	1.3	1.9

TABLE VII.—Continued

	Percents Correct				Year Scale Values				Genl. Scale Values
	I	II	III	IV	I	II	III	IV	
ille	70.8	62.1	94.7	90.2	3.0	3.3	1.4	1.9	2.4
*imperium	46.5	80.8	93.0	92.5	3.9	2.5	1.6	1.6	2.4
impero	61.3	88.6	92.1	92.4	3.4	2.0	1.7	1.7	2.2
impetus	50.4	75.5	90.4	88.0	3.8	2.8	1.9	2.1	2.6
*in	94.6	95.3	99.1	100.	1.4	1.3	.3	0	.8
incendo	53.2	80.1	97.3	98.9	3.7	2.5	.9	.4	1.9
*infero	25.8	60.7	67.8	71.7	4.8	3.4	3.1	2.9	3.6
iniuria	60.5	84.7	85.2	91.3	3.4	2.3	2.3	1.8	2.4
*instruo	20.7	54.0	65.2	81.5	5.0	3.7	3.2	2.5	3.6
inter	70.0	94.3	96.5	97.8	3.0	1.5	1.1	.8	1.6
ipse	56.3	87.2	96.5	92.4	3.6	2.1	1.1	1.7	2.1
is	74.8	80.8	87.8	94.6	2.8	2.5	2.1	1.4	2.2
ita	54.6	79.5	92.1	90.2	3.6	2.6	1.7	1.9	2.4
iter	69.4	88.0	95.6	92.4	3.0	2.1	1.3	1.7	2.0
iubeo	67.2	90.8	95.6	97.8	3.1	1.8	1.3	.8	1.8
latus	70.0	73.5	91.2	93.5	3.0	2.9	1.8	1.6	2.3
locus	84.8	98.2	99.1	100.	2.3	.5	.3	0	.8
longus	88.5	91.5	96.5	98.9	2.0	1.8	1.1	.4	1.3
lux	52.1	65.3	96.5	98.9	3.7	2.9	1.1	.4	2.0
*magnus	99.4	98.2	100.	98.9	.1	.7	0	.4	.3
malo	14.3	17.6	42.6	41.3	5.4	5.2	4.1	4.1	4.7
malus	81.5	78.1	91.2	88.0	2.5	2.7	1.8	2.1	2.2
manus	74.5	90.4	98.2	100.	2.8	1.9	.7	0	1.3
*mater	97.5	97.9	99.1	100	.9	.8	.3	0	.5
meus	79.2	75.9	90.4	93.5	2.6	2.8	1.9	1.6	2.2
mille	65.0	78.4	94.7	91.3	3.2	2.6	1.4	1.8	2.3
miles	68.9	62.8	76.5	78.3	3.1	3.3	2.7	2.6	2.9
mitto	94.9	96.4	99.1	96.7	1.4	1.1	.3	1.1	1.0
mors	71.4	76.6	88.6	91.3	3.0	2.7	2.0	1.8	2.4
mos	11.5	30.3	46.9	77.2	5.6	4.6	3.9	2.7	4.2
moveo	93.5	96.5	96.5	96.7	1.6	1.1	1.1	1.1	1.2
*multus	45.9	49.4	53.9	58.7	4.0	3.8	3.7	3.5	3.8
munio	71.1	80.9	86.9	81.5	3.0	2.5	2.1	2.5	2.5
murus	85.4	90.4	97.3	96.7	2.2	1.9	.9	1.1	1.5
nam	35.0	75.9	87.8	89.1	4.4	2.8	2.1	2.0	2.8
navis	85.7	95.0	91.2	92.4	2.2	1.4	1.8	1.7	1.8
*ne	60.8	81.5	82.6	87.0	3.4	2.5	2.4	2.1	2.6
nemo	40.9	62.1	85.2	87.0	4.1	3.3	2.3	2.1	3.0
neque	48.7	83.7	95.6	92.4	3.8	2.3	1.3	1.7	2.3
nihil	72.0	82.6	96.5	97.8	2.9	2.4	1.1	.8	1.8
nisi	16.5	45.2	85.2	91.3	5.2	4.0	2.3	1.8	3.3
nomen	59.9	84.7	95.6	97.8	3.4	2.3	1.3	.8	1.9
non	97.4	97.1	100.	92.4	2.1	1.0	0	1.7	1.2
noster	68.0	86.0	94.7	91.3	3.1	2.2	1.4	1.8	2.1
novem	54.9	43.4	62.6	79.3	3.6	4.0	3.3	2.6	3.4
novus	46.5	66.0	89.5	93.5	3.9	3.2	1.9	1.6	2.7
*nox	62.4	86.5	100.	100.	3.3	2.2	0	0	1.4
nullus	50.1	79.4	92.1	92.4	3.8	2.6	1.7	1.7	2.4

TABLE VII.—Continued

	Percents Correct				Year Scale Values				Genl. Scale Values
	I	II	III	IV	I	II	III	IV	
nunc	42.6	48.7	93.0	97.8	4.1	3.8	1.6	.8	2.6
nuntius	65.5	77.3	90.4	83.7	3.2	2.7	1.9	2.3	2.5
ob	12.9	25.1	50.4	62.0	5.5	4.8	3.8	3.3	4.4
*occupo	86.0	95.0	93.0	96.7	2.1	1.4	1.6	1.1	1.6
omnis	89.3	97.1	100.	98.9	2.0	1.0	0	.4	.8
oppugno	79.5	94.6	93.9	94.6	2.6	1.4	1.5	1.4	1.7
opus	50.7	78.0	86.9	83.7	3.8	2.7	2.1	2.3	2.7
pars	77.6	91.0	92.1	93.5	2.7	1.8	1.7	1.6	1.9
parvus	92.1	92.8	99.1	97.8	1.7	1.6	.3	.8	1.1
*pater	96.6	96.7	100.	100.	1.0	1.1	0	0	.5
patior	12.0	24.7	61.7	63.0	5.5	4.8	3.4	3.3	4.3
pauci	66.4	86.8	96.5	97.8	3.2	2.1	1.1	.8	1.8
pax	68.3	77.7	92.1	94.6	3.1	2.7	1.7	1.4	2.2
per	73.9	87.5	96.5	98.9	2.9	2.1	1.1	.4	1.6
periculum	86.5	96.4	100.	98.9	2.2	1.1	0	.4	.9
pervenio	47.3	81.9	79.9	80.4	3.9	2.4	2.6	2.5	2.9
peto	57.1	83.0	93.9	92.4	3.5	2.4	1.5	1.7	2.3
pono	55.7	68.1	86.9	92.4	3.6	3.1	2.1	1.7	2.6
populus	94.9	97.8	99.1	98.9	1.4	.8	.3	.4	.7
possum	81.8	91.1	98.2	96.7	2.5	1.8	.7	1.1	1.5
*posterus	22.4	49.1	60.8	59.8	4.9	3.8	3.4	3.4	3.9
post	79.0	90.7	92.1	95.7	2.6	1.8	1.7	1.3	1.8
praesum	29.1	52.6	66.9	64.1	4.6	3.7	3.2	3.4	3.7
primus	93.0	97.8	99.1	100.	1.6	.8	.3	.0	.7
princeps	71.4	76.6	87.8	91.3	3.0	2.7	2.1	1.8	2.4
pro	52.6	70.6	85.2	91.3	3.7	2.8	2.3	1.8	2.7
proelium	90.2	98.1	98.2	98.9	1.9	.4	.7	.4	.9
proficiscor	41.7	77.3	80.8	82.6	4.1	2.7	2.5	2.4	2.9
puer	98.6	96.4	96.5	98.9	.5	1.1	1.1	.4	.8
pugno	95.2	98.8	100.	97.8	1.3	.4	0	.8	.6
quam	56.0	59.3	71.3	71.7	3.6	3.2	3.0	3.0	3.2
quartus	55.7	74.5	74.7	91.3	3.6	2.8	2.8	1.8	2.8
quattuor	75.6	76.2	78.2	94.6	2.8	2.7	2.6	1.4	2.6
que	45.9	68.5	62.6	80.4	4.0	3.1	3.3	2.5	3.2
qui	68.6	89.7	97.3	97.8	3.1	1.9	.9	.8	1.7
quis	68.6	51.5	69.5	80.4	3.1	3.7	3.0	2.5	2.8
quisquam	11.8	25.4	47.8	46.7	5.6	4.8	3.9	3.9	4.5
quisque	15.4	28.2	32.2	40.2	5.3	4.7	4.5	4.2	4.7
*quod	62.7	89.0	88.6	94.6	3.3	1.9	2.0	1.4	2.2
recipio	55.2	81.5	94.7	93.5	3.6	2.5	1.4	1.6	2.3
regnum	70.3	83.3	89.4	95.7	3.0	2.4	1.9	1.3	2.1
relinquo	55.7	65.7	90.4	96.7	3.6	3.2	1.9	1.1	2.4
res	77.0	87.2	99.1	92.4	2.7	2.1	.3	1.7	1.7
rogo	25.5	59.3	86.9	93.5	4.8	3.5	2.1	1.6	3.0
saepe	86.5	81.5	100.	95.7	2.1	2.5	0	1.3	1.5
satis	29.1	72.0	92.1	93.5	4.6	2.9	1.7	1.6	2.7
scio	41.4	58.2	93.0	95.7	4.1	3.5	1.6	1.3	2.6
secundus	87.9	93.5	94.7	94.6	2.1	1.6	1.4	1.4	1.6

TABLE VII.—Continued

	Percents Correct				Year Scale Values				Genl. Scale Values
	I	II	III	IV	I	II	III	IV	
*sed	94.1	97.8	100.	100.	1.5	.8	0	0	.6
senatus	54.9	86.5	90.4	93.5	3.6	2.2	1.9	1.6	2.3
sequor	54.9	83.0	95.6	100.	3.6	2.4	1.3	0	1.8
servus	92.4	91.4	93.0	82.6	1.7	1.8	1.6	2.4	1.9
si	73.9	95.7	98.2	100.	2.9	1.3	.7	0	1.2
signum	91.8	98.8	98.2	96.7	1.7	.5	.7	1.1	1.0
similis	82.0	91.4	97.3	98.9	2.4	1.8	.9	.4	1.4
sine	54.6	80.5	97.3	96.7	3.6	2.5	.9	1.1	2.0
solus	66.6	65.0	87.8	93.5	3.1	3.2	2.1	1.6	2.5
spes	53.2	87.9	98.2	100.	3.7	2.1	.7	.0	1.6
*sui	35.6	54.0	71.3	64.1	4.3	3.7	3.0	3.3	3.6
sum	78.1	84.4	97.3	94.6	2.7	2.3	.9	1.4	1.8
supero	71.7	80.1	93.0	84.8	2.9	2.5	1.6	2.3	2.3
*superus	32.3	58.2	58.2	65.2	4.5	3.5	3.5	3.2	3.7
suus	51.2	60.0	78.2	81.5	3.8	3.4	2.6	2.5	3.1
tam	46.5	45.9	74.7	69.6	3.9	4.0	2.8	3.0	3.4
tamen	46.2	75.2	85.2	82.6	3.9	2.8	2.3	2.4	2.8
tantus	31.6	65.7	83.4	87.0	4.5	3.2	2.4	2.1	3.0
telum	85.7	95.3	97.3	98.9	2.2	1.3	.9	.4	1.2
tempus	69.7	86.5	97.3	97.8	3.0	2.2	.9	.8	1.7
teneo	63.3	92.5	98.2	98.9	3.3	1.7	.7	.4	1.5
tertius	58.0	88.2	97.3	98.9	3.5	2.0	.9	.4	1.7
timeo	75.0	91.8	98.2	100.	2.8	1.7	.7	.0	1.3
totus	60.9	82.4	71.9	78.4	3.4	2.4	2.9	2.6	2.8
*trado	25.2	39.2	44.3	41.3	4.8	4.2	4.0	4.1	4.3
tres	88.8	89.3	91.2	97.8	2.0	2.0	1.8	.8	1.7
tu	66.1	78.0	96.5	98.9	3.2	2.7	1.1	.4	1.8
tum	32.2	53.7	76.5	90.2	4.5	3.7	2.7	1.9	3.2
tuus	63.3	65.7	94.3	91.3	3.3	3.2	1.5	1.8	2.4
ubi	76.7	78.4	85.2	89.1	2.7	2.6	2.3	2.0	2.4
ullus	23.5	40.9	66.9	83.7	4.9	4.2	3.2	2.3	3.6
*ulterior	19.3	49.8	61.7	51.0	5.1	3.8	3.4	3.8	4.0
undique	22.7	64.6	65.2	69.6	4.9	3.2	3.2	3.0	3.6
*unus	97.7	97.8	100.	100.	.8	.8	0	0	.4
urbs	97.4	95.3	100.	98.9	.9	1.3	0	.4	.7
ut	79.8	93.5	95.6	95.7	2.6	1.6	1.3	1.3	1.7
vasto	70.0	88.1	83.4	82.6	3.0	2.0	2.4	2.4	2.5
venio	89.9	93.9	99.1	97.8	1.9	1.5	.3	.8	1.1
vereor	30.2	55.1	72.1	68.4	4.6	3.6	2.9	3.1	3.6
via	93.8	93.5	98.2	98.9	1.5	1.6	.7	.4	1.0
*video	95.2	97.8	100.	100.	1.3	.8	0	0	.5
vinco	67.2	74.8	95.6	92.4	3.1	3.0	1.3	1.7	2.3
vir	97.4	96.7	98.2	98.9	.9	1.1	.7	.4	.8
virtus	80.1	84.0	86.0	100.	2.5	2.3	2.2	0	1.8
vis	50.7	72.7	89.5	95.7	3.8	2.9	1.9	1.3	2.5
vita	66.6	73.1	93.0	97.8	3.2	2.9	1.6	.8	2.1
volo	65.8	89.3	96.5	95.7	3.2	2.0	1.1	1.3	1.9
					735.2	566.3	398.0	361.3	513.9

The method of determining the scale values for each year is that briefly described above for the first year test. The procedure may be illustrated as follows: *ab* was correctly translated by 331 out of 357 first year pupils, or, 92.7 percent. The P. E. equivalent on the base line of a normal surface of frequency is —2.155 P. E.[4] This value subtracted from —3.8 P. E. gives 1.645 or 1.6 the scale value assigned to it for the first year. In the second year *ab* was given correctly by 276 out of 283 pupils. The P. E. equivalent is —2.905 P. E., which subtracted from —3.8 P. E., gives .895, or .9 the assigned value. This procedure was carried out for each of the words and for each year. The sum of the values for each year appears at the foot of the Table. If the entire list of words is used with first year pupils then a perfect score would be 735.2. Toward this score for a correct translation of *ab* the pupil would receive 1.6. If the list is given to second year pupils the perfect score would be 566.3 and toward this score for a correct translation of *ab* he would receive .9.

If the selected list of 200 words is used then the average scores and the sum of the scale values would be as follows:

	I	II	III	IV	...
Averages.....	130	156	177	181	
Sum of Scale Values.....	621.9	479.4	330.6	297.4	430.7

The determination of the general or average scale value is somewhat more troublesome. The method employed is that described in detail by Buckingham.[5] It is necessary to discover the size of the intervals between the medians of the different years. This involves determining the amount and percent. of overlapping between the different years Some first-year pupils reach or exceed the median ability of the second-year pupils, a smaller number that of the third year and a still smaller number that of the fourth year. The following Table VIII sets forth the facts.

The table reads as follows: Among first-year pupils there were 50 or 14.1 percent who reached or exceeded the median of the second-year pupils, the P. E. equivalent being +1.595 P. E. There were 18 first-year pupils, or 50 percent, who reached or

[4] See Table of P. E. Values corresponding to Given Percents of the Normal Surface of Frequency, Buckingham, op. cit., p. 116.

[5] Op. cit., pp. 31–40. Also BUCKINGHAM—*Notes on the Derivation of Scales in School Subjects.* Fifteen Yearbook of the Nat. Soc. for the Study of Education, Part I, 1916, pp. 33–40.

TABLE VIII.

Number and Percent of Pupils Reaching or Exceeding the Median in Every Other Year

		I	II	III	IV
I.	No.	...	50	18	11
	Percent.	...	14.1	5.0	3.1
	P. E.	...	+1.595	+2.439	+2.767
II.	No.	234	.....	64	49
	Percent.	82.7	.....	22.6	17.3
	P. E.	—1.397	.....	+1.115	+1.397
III.	No.	114	95	.....	44
	Percent.	99.1	82.6	.....	38.3
	P. E.	—3.506	—1.391	.....	+ .441
IV.	No.	90	80	62	.....
	Percent.	97.8	86.9	67.4	.....
	P. E.	—2.986	—1.663	— .669	.....

exceeded the median ability of the third-year pupils, the P. E. equivalent being +2.439 P. E. From this table it is possible to determine various direct and derived values for the intervals between the first-year median taken as a point of reference and the other years. For example there are various values for the interval or median distance between the first year and the second year in terms of units of P. E. The distance between the first-year and the second year is directly represented by two values 1.595 and 1.397, two other derived values are obtained by subtracting from the distance between the first and third year medians the distance between the second and third year medians and this same distance expressed negatively, viz., 1.324 and 2.115, two other derived values by subtracting from the distance between the first and fourth year medians, the distance between the second and fourth year medians and also this distance expressed negatively, viz., 1.370 and 1.323. Other derived values are possible, but these six were regarded as sufficient for determining the distances between the medians. The average value for the interval between the first year and the second year is 1.521. This average gives the same value to all the measures of the intervals, direct and derived. The intervals obtained directly are more reliable than those obtained indirectly. These were given a weight of 6 and the other two involving a skipping of one or two medians were weighted 4 and 2, respectively. The weighted average then becomes 1.541. Carrying this method out for each year the intervals between the years are as follows:

M_1—M_2	M_2—M_3	M_3—M_4
1.541 P. E.	1.281 P. E.	.465 P. E.

When referred to the first year median the median distance between it and the third and fourth years are:

M_1—M_3	M_1—M_4
2.821 P. E.	3.287 P. E.

The intervals between the various years being known, all that is necessary to do to determine the general scale value is to add to the P. E. value for the first year the intervals at which the medians of each year stand above the first year. The average of the values thus obtained gives the average position of the word. The method is illustrated for two words as follows:

	P. E.		P. E.	
	I	II	III	IV
ab.....	2.155	2.905	2.857	3.395
acer.....	.922	.727	1.602	2.245

When referred to the first year median as the point of reference, by adding to the second, third and fourth year P. E.s the interval between the medians 1.541, 2.822 and 3.287, respectively, and averaging the positions we get the following:

	P. E. I	P. E. II	P. E. III	P. E. IV	Average Position
ab.....	—2.155	—1.364	— .035	— .108	—.915
acer.....	— .922	+ .814	+1.220	+1.042	+.538

Thus far the procedure in scaling the words is identical with that of Buckingham. The average position when referred to the first year median as the point of reference, however, because of the fact that there were many very easy words in the list would give a scale with — and + values. To rid the scale of the minus values, I planned to use as point of reference, not the first year median, but the position of the easiest word in the list. This is *et* with an average position —1.673. Inability to give the meaning of *et* is pretty close to the zero point in ability in Latin. The easiest word for the first year pupils, however, is *magnus* and for second year pupils *cum*. No word was translated correctly by all first and second year pupils. There were some words that were correctly translated by all third and fourth year pupils and the scale values are undetermined. A point of reference below the position of *et* was arrived at as follows: The arbitrarily assumed zero point for each year indicated above is —3.8. P. E. On the scale this would be the position occupied by a word which would be translated correctly by 995 out of 1000

pupils. When this position for each year is referred to the first year median by adding as before 1.541, 2.822 and 3.287 respectively, we get:

—3.8	P. E.	for	the	first year
—2.259	P. E.	"	"	second year
— .978	P. E.	"	"	third year
— .513	P. E.	"	"	fourth year
Av. 1.887				

The average position thus obtained is —1.887, which was taken as the point of reference. The position of the easiest word *et* —1.673 then by subtraction from —1.887 is +.214 or .2 the assigned value. *Ab* with an average position —.915 when referred to this point of reference has an assigned value of +.972 or 1.0. *Acer* with an average position +.538 when so referred gets a value of +2.425 or 2.4. This procedure which has the effect of averaging the positions of the words for the four years was carried out for all the words and is the basis for the general scale value indicated in Table VII.

The general scale value is an attempt to determine the variation in the difficulty of each word or the weight to be assigned to it, regardless of the year or grade. Practically, the year scale values will perhaps be more useful than the general scale value, for after all, our measurements of ability in Latin vocabulary will be of pupils who have had one, or two, or three or four years of Latin and the uses of the measurements will be to compare pupils, classes and schools under these conditions.

There were certain words that were not missed in either the third or the fourth years and a few that were not missed by any third and fourth year pupils. The P. E. equivalents in these years are of course indeterminate. In order to give these words a position in the general scale, it was necessary to assign them some value. The assumption was made that if more pupils had been tested, they would have been missed by five out of a thousand pupils, and the P. E. equivalent —3.8 was arbitrarily assigned to each of them. No attempt was made to vary this value on a basis of the behavior of the words in the first two years.

The list of words may be used in various ways: the entire list may be given and valuable comparison made with performances in typical high schools without regard to the scale values; better would be the use of the 200 words not starred without the scale

values; still better would be to give the entire list or the selected list and assign the weights given in Table VII, using either the general scale values, or the year scale values.

There are, however, two uses which may be made of the data which will be practically valuable: (1) A selection may be made of a smaller list of words, having the same, or approximately the same, scale values, which may then be disregarded. A selected list of twenty-five such words is given below. The words selected are those which decrease in difficulty progressively by fairly uniform steps, from the first year on. They are not too difficult for first year pupils, nor too easy for fourth year pupils. Such a list ought to be of use for many testing purposes.

Selected List of 25 Words and Scale Values

	I	II	III	IV	Average
accipio	3.2	2.6	2.0	1.4	2.3
adventus	3.9	2.4	1.9	1.3	2.4
appello	4.3	2.7	1.9	1.6	2.6
apud	3.4	2.1	2.0	1.1	2.1
caput	2.8	2.6	1.8	1.3	2.1
certus	4.5	3.2	2.3	2.0	3.0
cur	3.3	3.0	1.7	1.4	2.4
dum	5.1	3.1	2.5	1.6	3.0
educo	3.7	2.2	1.9	1.3	2.3
ignis	2.7	2.1	1.6	1.3	1.9
is	2.8	2.5	2.1	1.4	2.2
latus	3.0	2.9	1.8	1.6	2.3
mors	3.0	2.7	2.0	1.8	2.4
novus	3.9	3.2	1.9	1.6	2.7
pax	3.1	2.7	1.7	1.4	2.2
post	2.6	1.8	1.7	1.3	1.8
princeps	3.0	2.7	2.1	1.8	2.4
pro	3.7	2.8	2.3	1.8	2.7
regnum	3.0	2.4	1.9	1.3	2.1
relinquo	3.6	3.2	1.9	1.1	2.4
rogo	4.8	3.5	2.1	1.6	3.0
suus	3.8	3.4	2.6	2.5	3.1
tantus	4.5	3.2	2.4	2.1	3.0
tum	4.5	3.7	2.7	1.9	3.2
vis	3.8	2.9	1.9	1.3	2.5

With this list standard scores in terms of numbers and percents correct would be as follows:

	I	II	III	IV
Number correct	13.7	18.6	22.0	22.6
Percents correct	54.8	74.3	88.0	90.4

(2) The list of 200 words may be subdivided into alternative lists of equal difficulty. Such an arrangement appears in four lists A, B, C, and D with the words arranged in order of difficulty and the corresponding scale values.

Latin Vocabulary Test

A		B		C		D	
bellum	.4	cum	.4	castra	.5	ex	.5
populus	.7	duco	.7	pugno	.6	hostis	.6
primus	.7	urbs	.7	auxilium	.8	vir	.8
facio	.9	locus	.8	omnis	.8	puer	.8
duo	.9	audio	.9	annus	.9	proelium	.9
dico	1.0	decem	1.0	ab	1.0	periculum	1.0
finis	1.0	habeo	1.0	via	1.0	mitto	1.0
ante	1.1	parvus	1.1	venio	1.1	signum	1.0
moveo	1.2	dux	1.2	amicus	1.2	ad	1.2
non	1.2	si	1.2	telum	1.2	de	1.3
timeo	1.3	manus	1.3	manus	1.3	longus	1.3
dies	1.5	deus	1.5	similis	1.4	capio	1.4
murus	1.5	possum	1.5	saepe	1.5	teneo	1.5
exercitus	1.6	corpus	1.6	cognosco	1.6	atque	1.6
spes	1.6	secundus	1.6	per	1.6	inter	1.6
tertius	1.7	tempus	1.7	oppugno	1.7	homo	1.7
res	1.7	qui	1.7	ut	1.7	tres	1.7
hic	1.8	gero	1.8	do	1.8	centum	1.8
post	1.8	pauci	1.8	navis	1.8	iubeo	1.8
virtus	1.8	tu	1.8	sum	1.8	sequor	1.8
nihil	1.8	difficilis	1.9	fortis	1.9	gravis	1.9
servus	1.9	pars	1.9	nomen	1.9	ignis	1.9
ego	2.0	animus	2.0	volo	1.9	incendo	1.9
filius	2.0	iter	2.0	lux	2.0	sine	2.0
vita	2.1	apud	2.1	caput	2.1	ipse	2.1
malus	2.2	meus	2.2	noster	2.1	regnum	2.1
is	2.2	impero	2.2	pax	2.2	accipio	2.3
mille	2.3	latus	2.3	facilis	2.3	educo	2.3
neque	2.3	peto	2.3	senatus	2.3	supero	2.3
adventus	2.4	acer	2.4	recipio	2.3	vinco	2.3
altus	2.4	consilium	2.4	iniuria	2.4	ille	2.4
cur	2.4	ita	2.4	mors	2.4	nullus	2.4
princeps	2.4	relinquo	2.4	tuus	2.4	ubi	2.4
ager	2.5	munio	2.5	nuntius	2.5	solus	2.5
appello	2.6	fero	2.6	vis	2.5	vasto	2.5
iam	2.6	nunc	2.6	pono	2.6	quattuor	2.6
celer	2.7	acies	2.7	scio	2.6	fuga	2.6
fides	2.7	idem	2.7	novus	2.7	impetus	2.6
opus	2.7	pro	2.8	satis	2.8	etiam	2.8
nam	2.8	quis	2.8	tamen	2.8	totus	2.8
miles	2.9	pervenio	2.9	proficiscor	3.0	convenio	3.0
rogo	3.0	meus	3.0	certus	3.0	dum	3.0
ibi	3.1	diu	3.1	suus	3.1	alius	3.2
tum	3.3	nisi	3.3	que	3.2	quam	3.2
aliquis	3.4	debeo	3.4	alter	3.4	novem	3.4
deligo	3.6	humilis	3.6	gratia	3.5	tam	3.4
ullus	3.6	undique	3.6	veroer	3.6	conicio	3.7
praesum	3.7	discedo	3.7	fio	4.0	eques	4.0
ulterior	4.0	conficio	4.1	mos	4.2	patior	4.3
quisque	4.7	malo	4.7	quisquam	4.5	ob	4.4
	107.7		107.9		107.5		107.6

The second point of attack in developing standard tests for Latin is to secure a measure of ability to translate not isolated words, but words as they occur in sentences. A sentence test to be of value should not contain words with which the pupil has not come in contact. One of the main purposes of the study of vocabularies was to secure materials for the construction of sentences which could fairly be used to test any high school pupil who had studied Latin for a year or more. Results with this test will be reported in the December issue of this JOURNAL.

A GRADUATED SCALE FOR DETERMINING MENTAL AGE

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In the face of the contemporary activity in the field of mental testing a considerable amount of courage is required to place before the public a group of tests which one may label a complete and comprehensive scale. Yet the results achieved by the use of the scale here presented seem to warrant its addition to the literature of the subject.

During the time in which the author was serving his novitiate in this field he early discovered the lack of system and coherence of the commonly used mental tests. The present study is the result of an attempt to work out a scale which would fill the requirements of a "first aid" test while investigating more or less thoroughly the mental type of the subject.

The characteristic features of the scale are: (1) The same tests are used for all ages and the mental age determined by the manner of the individual reaction, measured in terms of the relative number of points for each age. (Norms have been established for the ages six to fourteen, inclusive.) This method dispenses with a great amount of unnecessary labor both on the part of the experimenter and the child. (2) The tests chosen are of such a nature as to appeal to the interest of the child, whatever the age. Moreover, as a proof that they are genetic tests of intelligence, the ability to react to each test increases uniformly as we go up the age scale, with a wide range between upper and lower limits. (3) The tests measure native ability regardless of training. (4) The tests are comprehensive. (5) They are compact and systematic. (6) They may be quickly and easily applied, averaging about thirty minutes per subject. (7) The results are readily evaluated. (8) The results are significant both from the standpoint of the clinical psychologist and the teacher. It is believed that the scale is a simple and coherent system which may be used efficiently, both to determine mental age and mental type. In the hands of the novice it will indicate not only the group to which the child belongs, but also his predominating characteristics. The expert will find it valuable as an index to further tests which may be deemed necessary

for a more complete analysis of the subject's mentality. In either case, with careful manipulation, the mental age will be closely determined.

In establishing the norms presented in this work the tests were given personally by the author to about 550 children of the public schools of Lincoln, Nebraska. Deducting a number of cases tested before the scale was complete and others which were tested for clinical purposes, the total embodied in the evaluation of the norms is 405, an average of 45 for each age studied. These cases were selected from eight different schools, collectively representative of all classes of population usually found in a cosmopolitan community. The children were chosen by the principal in conjunction with the teacher, after the problem had been carefully explained by the experimenter. Teachers and principals, as well as children, were intensely interested in the work and put forth every effort to contribute toward its success. It was required of each child that he be "just average or normal," neither accelerated nor retarded; that is, that the pedagogical age should correspond with the chronological age. A great deal of confidence is placed in the type of children selected because of the fact that each principal had known practically every child from the time of entrance, in most cases being familiar with the child's family history. Furthermore, the work was undertaken at an opportune time, because of the fact that the Lincoln schools were systematically working out the problem of classification which had been inspired by the superintendent and fostered by the Principals' Club.

The children of each group were within the limits of five months over and four months under the year, with an average age very close to the exact year. (For example, the 7-year group averaged 7 years, 20 days, with a mean variation of 2 months, 3 days. The 9-year group averaged 9 years, 2 days, with a mean variation of 2 months, 11 days.)

The method employed in conducting the tests was similar to that used in the Binet tests and their modifications. A room was provided in each building which would be as quiet and free of disturbance as possible. A small table was placed opposite the window with the experimenter seated facing the light and the child on his right. From the moment the child entered the room he was treated with cordial respect and made to feel perfectly at ease, with the understanding that he was contributing toward the solution of a given problem rather than merely being

tested. In no case was the test begun until the child felt at home and was in an attitude which would produce uniform results. Each child was cautioned not to tell anything about the tests and in no case was there evidence of collusion. The tests were all given during the regular school hours.

The scale is composed of nine separate tests, divided into three general groups, as follows:

A. Perception, Tests I and IX.
B. Memory span.
   a. Auditory, Tests II and III.
   b. Visual, Test IV.
   c. Logical, Test V.
C. Judgment.
   a. Visual proportion, Test VI.
   b. Constructive problems, Test VII.
   c. Definitions, Test VIII.

TEST BLANK

Name ..... School ..... Date .....
Grade ..... Born .....
Mental Age ..... Age .....

I. Card of objects (5 seconds) Bu. Co. Cr. Gla. Ky. Kni. Mbl. Na. Ni. Pn. Pcl. Pi. Sci. Scr. St.
II. Repeating digits .....
III. Repeating syllables .....
IV. Learning figures, 1 ..... 2 ..... 3 ..... Total .....
V. Association words (One Minute).
VI. Height of man standing by 50-foot tree. (Over) ..... feet.
VII. Problems (1) Square ..... (2) Rhombus..... (3) Rectangle .....
(4) Paper cut..... (5) Clock, 9:00.....2:00..... (6) Reconstruct triangles ..... (7) Paper cut.....
VIII. Definitions.
(1) Fork.
(2) Horse.
(3) Automobile.
(4) Poet.
(5) Tree.
(6) Kindness.
(7) Sweetness.
(8) Charity.
(9) Justice.
(10) Worm and snake.
IX. Sorting cards. .....min.....sec.....piles.....
Equivalent value.....min.....sec.

TEST I.

Fifteen familiar objects were fastened upon a white cardboard 37 cm. square, and covered with another cardboard of the same dimensions. (See Fig. 1.)[1] When the attention of the subject

[1] Since the laws of the United States prohibit the photographic reproduction of stamps or coins, this figure cannot be presented. The objects, arranged in miscellaneous order, were button, comb, crayon, glasses (spectacles), key, knife, marble, nail, nickel (coin), pen, pencil, pipe, scissors, screw, stamp.—EDITOR.

has become focussed on the experiment, the objects are exposed for five seconds. The number of objects remembered, with mean variation, are given in the following table:

Age	6	7	8	9	10	11	12	13	14
Av.....	3.3	4.2	4.3	4.9	5.0	5.7	5.7	6.1	6.4
M. V.....	.61	.70	.84	.85	.98	1.0	.96	.92	1.2

Test II.

The second is the Binet test for auditory memory span by use of digits. The child is directed to "Say these numbers after me." The subject is required to repeat correctly a group of digits in two out of three trials before passing to the next higher group. For example, in the 4-group, he may repeat 4–2–9–7 correctly, fail in repeating 5–3–1–8, and then repeat 6–1–9–4 correctly, when he will proceed to the next higher group.

29	847	4297	52814	384296	1695847	41629385
81	315	5318	47395	279314	2964375	25718394
73	926	6194	58319	618492	9285164	58261947

The test is scored on the basis of highest group passed. Below is the average number of digits for each age with mean variations: (For graphic representation see Fig. 2.)

Age	6	7	8	9	10	11	12	13	14
Av.....	4.4	4.9	5.5	5.7	5.6	5.8	6.0	6.1	6.4
M. V.....	.64	.56	.80	.70	.62	.57	.43	.44	.70

Test III

The third is supplementary to the second test, being repetition of syllables. I have made use of Goddard's sentences with one or two slight changes. Beginning with sentences of a few syllables, the entire list is given until the child reaches his maximum, and credit is given for the number of syllables in the last sentence correctly repeated. In no case is the child informed of his errors; when the maximum has been reached, we pass immediately to the next test as if there were no more sentences to be given. In this, as in all the other tests, the child will watch for confirmation of his answers. The norms are given below (see also Fig. 3):

Age	6	7	8	9	10	11	12	13	14
Av.....	15.7	16.0	17.1	18.1	18.0	19.7	20.3	22.4	24.0
M. V.....	1.1	1.1	1.5	1.6	1.7	2.0	2.2	2.6	3.0

Test IV.

The fourth test is for visual-motor memory. The material used is adapted from the odd-shaped figures in Seashore's *Manual* (See Fig. 4.) The method of procedure is as follows: The child

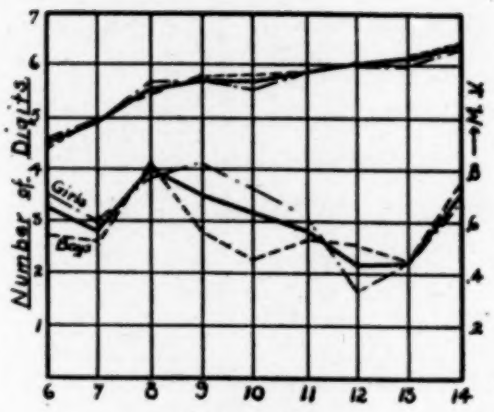


FIGURE 2

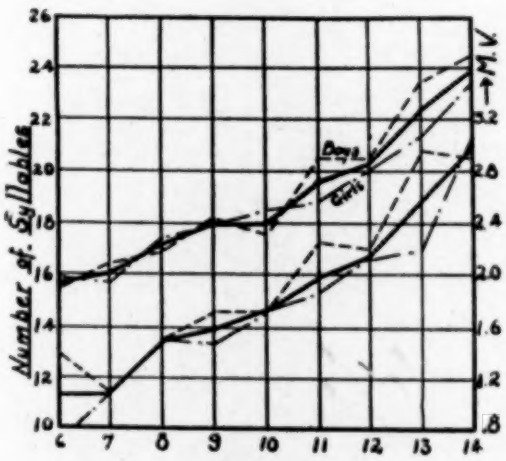


FIGURE 3

FIGURE 4

is given a piece of blank paper and shown the figures for about one second while the operator makes the following explanation: "Now I'm going to let you look at these things for just a few seconds, and then when I take them away, you will draw as many as you can remember." The figures are exposed for ten seconds. Three trials are given, the subject studies the figures before each trial, but is never permitted to look at his previous drawings. No hint is given of the number correctly drawn. Credit is given for the total number of correct figures for all three trials, allowing one-half point for reversed drawings. (See also Fig. 5.)

Age	6	7	8	9	10	11	12	13	14
Av.....	1.8	2.6	3.3	4.0	4.4	5.3	5.6	6.8	7.5
M. V.....	1.1	1.3	1.4	1.5	1.7	1.8	1.8	1.8	1.9

Test V.

This test is adapted from the third in Binet's twelve year group, in which the child is required to name as many words as he can in three minutes. My instructions to the child are: "Shut your eyes. Now name over all the things you can think of; just anything—any object." If the subject does not respond at once the experimenter may suggest *book*, which usually starts the reaction. Credit is given for common nouns only. The reaction continues for one minute.

It is believed that this method is superior to that used by Binet for three reasons: (1) By having the eyes closed the material is largely introspective. (2) By allowing one minute instead of three time is saved and the child is not fatigued. The number of words in the first twenty seconds is usually greater than that of the last forty, and no advantage is gained by prolonging the time. (3). The instructions are given in a manner which causes the child to name nouns—things—rather than words. It becomes, then, a test of rapidity of association. (See Fig. 6.)

Age	6	7	8	9	10	11	12	13	14
Av.....	12.5	14.2	17.8	22.2	22.3	27.4	32.2	30.0	32.1
M. V.....	4.7	4.6	4.7	5.4	6.2	5.8	6.5	7.7	5.9

Test VI.

The sixth test is a problem involving judgment of visual proportion. The child is told to "draw a picture of a tree fifty feet high with a man standing by it." For the ages six and seven this was varied, for obvious reasons to, "Draw a great big, high

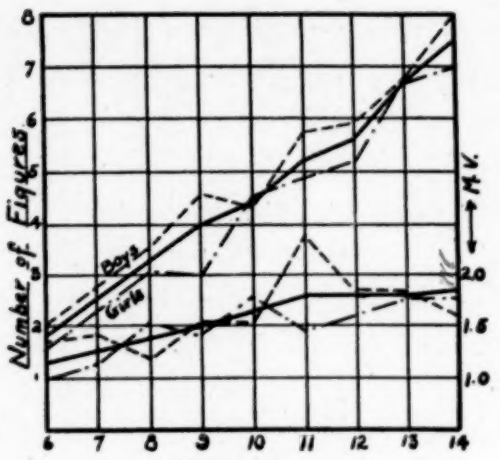


FIGURE 5

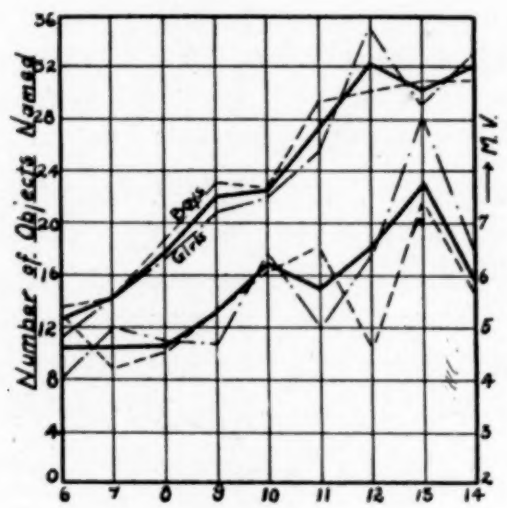
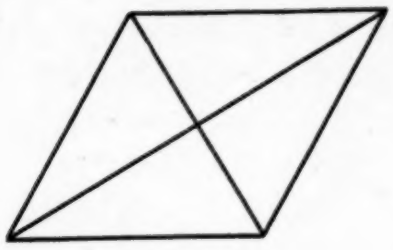
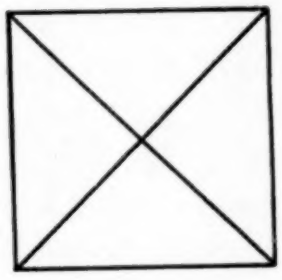


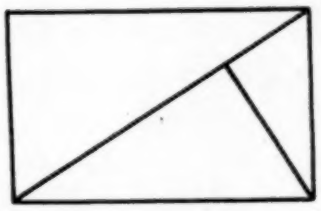
FIGURE 6



PROBLEM I



PROBLEM II



PROBLEM III

FIGURE 8

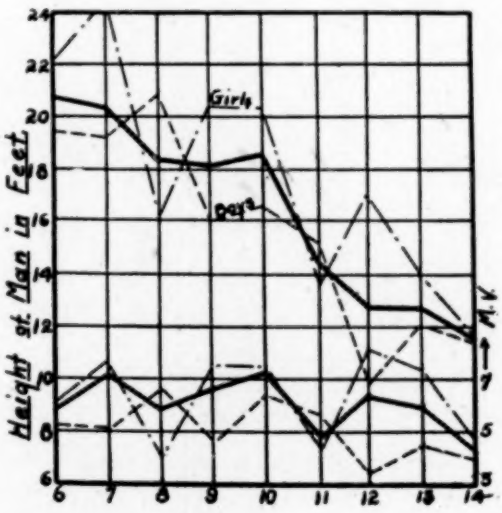


FIGURE 7

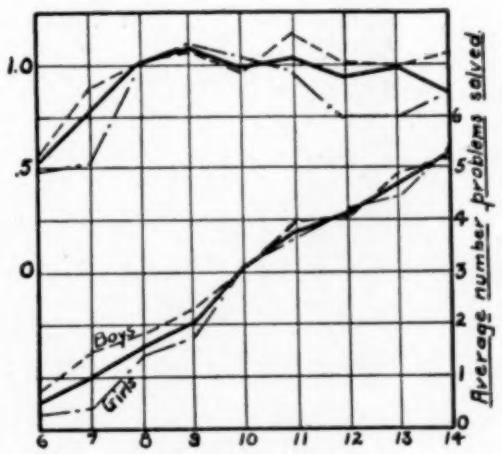


FIGURE 9

tree, fifty feet high, with a man standing by it." Credit was allowed for the relative height of the man, which correlates with intelligence to a remarkable degree. In clinical cases I have had a precocious girl of ten draw the man just six feet high while a badly retarded girl of fifteen drew the man twenty-two feet high. (See Fig. 7.)

Age	6	7	8	9	10	11	12	13	14
Height.....	20.8	20.4	18.4	18.2	18.6	14.5	12.9	12.9	11.7
M. V.....	5.7	7.3	6.0	6.8	7.3	4.7	6.6	5.9	4.4

Test VII.

This is a group of seven problems designed to test the judgment, ingenuity, and concentration of the child. Problems 1, 2, and 3 are cardboard puzzles—fitting triangles together to produce a form which is placed before the subject. (See Fig. 8.) Problem 4 is the paper-cutting test used by Binet in the 1908 series. After folding a square paper on its diameters the inner corner is cut off. The child is required to draw a picture of the paper "as it would look unfolded." Problem 5 is interchanging the hands of the clock at 9:00 and 2:00. Problem 6 is the reversed triangle used by Binet in the adult series. The subject is asked to draw the resulting figure if edge AB of the lower triangle were placed against edge CD of the upper triangle with point B at D. Problem 7 is the Binet paper cutting test for adults, 1905 series, as indicated in the drawing.

These seven problems are grouped together in the final scale. The table gives the total number of correct solutions out of the seven. (See Fig. 9.)

Age	6	7	8	9	10	11	12	13	14
Av.....	.5	1.0	1.6	2.0	3.1	3.8	4.1	4.7	5.3
M. V.....	.6	.8	1.1	1.2	1.0	1.1	.9	1.0	.9

It may be mentioned that experience soon teaches an experimenter that it is useless to give all tests in this group to every child. Only the first four are given to the six and seven year groups. Problem 6 is seldom given to a child who is apparently running below twelve in mentality. The rule which is followed throughout is to give the test if there is the least possibility of the child's passing it.

Test VIII.

It is generally agreed that ability to express ideas verbally is a good criterion of intelligence. In the search for a test which

could be used throughout the age series a group of carefully selected definitions was found to be of great value. The words, which were borrowed in most cases from lists previously used, fall into three groups: (1) Terms used in the everyday life of the child—*fork*, *horse*, and *automobile;* (2) Terms of more general significance—*man* and *tree;* (3) Abstract terms—*kindness*, *sweetness*, *charity*, and *justice*. A tenth was added under this group —the difference between a *worm* and a *snake*.

The type of definitions fall into three groups, as suggested by Binet:

1. Simple repetition or silence.
2. Definitions in terms of use.
3. Definitions in terms superior to use.

At first glance the problem of evaluating this series so that it could be used in a point system seemed especially difficult, but the scale which was adopted permits of accurate evaluation in the great majority of cases. Repetition or tautology receives no credit. If definition is in terms of use we allow one point. If the proper class is given, allow one point. For each differentium allow one point. For example, *automobile*, "to ride in," score 1; "a vehicle," score 1; "a vehicle to ride in," score 2; "a self-propelled vehicle," score 3.

Summary of Points in Definition Test. (See also Fig. 10.)

Age	6	7	8	9	10	11	12	13	14
Av.....	3.2	4.3	5.6	6.8	7.7	11.2	12.4	13.8	15.6
M. V.....	1.9	1.5	1.5	1.6	2.5	2.0	2.8	2.6	3.2

Test IX.

For the final test we employ a set of fifty cards utilizing the rather complex function of discrimination of form and color. The cards are the same size as ordinary playing cards and of five kinds, ten of each kind. Three colors are used—blue, green, and red, and three forms—circle, square, and triangle. (See Fig. 11.) Each card has three spots, blue at the top, green at the centre, and red at the bottom, the variation in the different sets produced by interchanging the forms.

The cards are shown to the subject with this explanation: "Now I want you to sort these cards for me. I'll show you the different kinds there are. This kind, and this kind, etc. Now

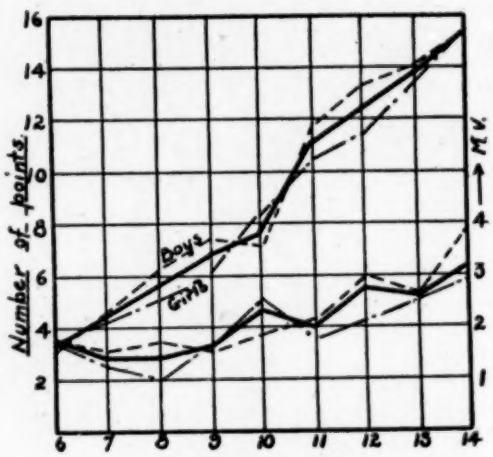


FIGURE 10

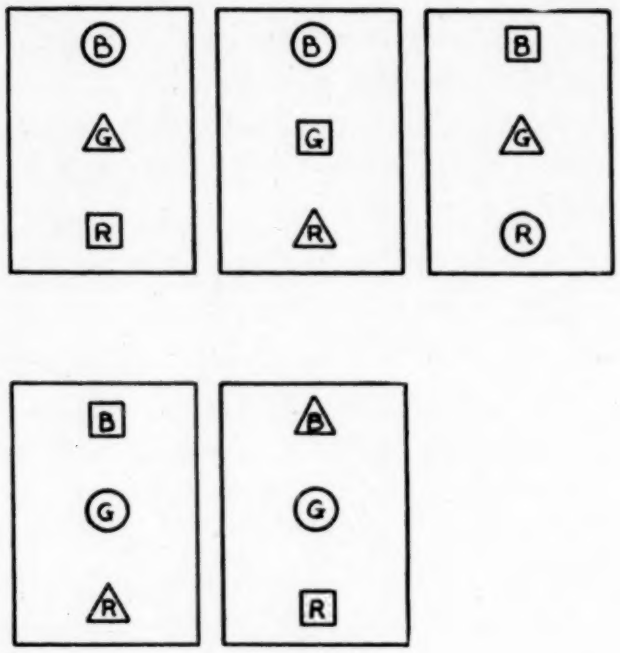


FIGURE 11

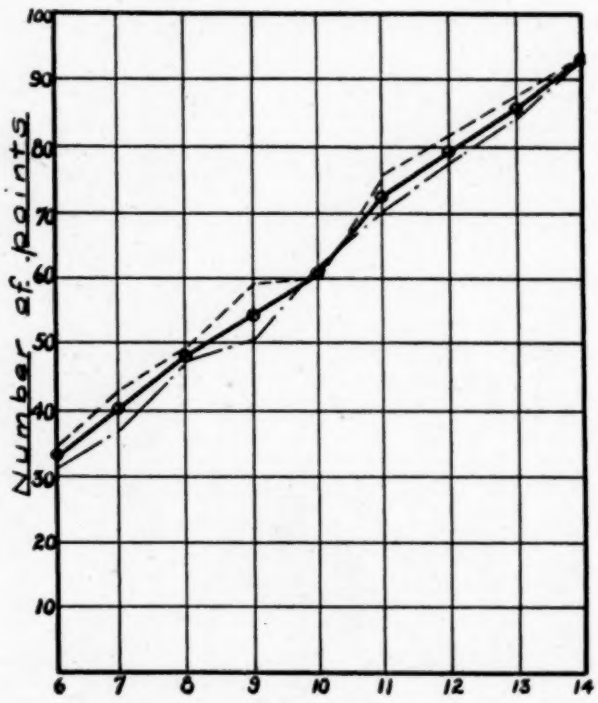


FIGURE 13

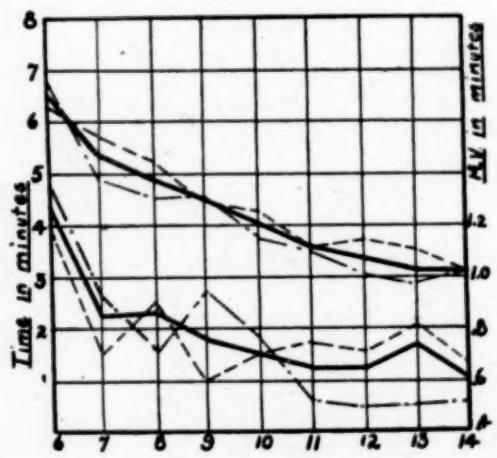


FIGURE 12

then, you are to sort them out, putting the ones that are alike in the same pile. Do you see how they are all different?" Then gathering up the five specimen cards, placing them at the bottom of the pack, all are handed to the child with the remark: "If you find a card and have no place to put it, start a new pile. Just as quickly as you can, now, but don't make any mistakes." A record is taken of the time, number of piles and errors. The latter are rapidly checked by having the similar cards marked on the back with the number of the set. In the table seconds have been converted to minutes. (See Fig. 12.)

Age	6	7	8	9	10	11	12	13	14
Age.....	6.53	5.37	4.86	4.5	4.05	3.56	3.45	3.17	3.10
M. V.....	1.28	.84	.86	.77	.79	.65	.64	.73	.61

Evaluation of Points for the Graduated Scale

The assigning of weight to the several tests is necessarily an arbitrary matter. The ideal would be to give equal weight to the various mental processes if they could be labelled and tested. But that being impossible, effort was made to distribute the weights to the different tests in a manner which would facilitate, rather than hinder, the task of evaluating the material, while at the same time distributing the points so that the increase from year to year would be as large as possible.

Test I.—Allow one point for each object enumerated.

Test II.—Allow one point for each digit.

Test III.—Divide number of syllables by *4*.

Test IV.—Allow two points for each figure correctly drawn.

Test V.—Divide total number of words given by *3*.

Test VI.—Divide 100 by the height of the man in feet.

Test VII.—Multiply points made in the seven problems by *3*.

Test VIII.—Allow one point for each score as indicated in the description of this test.

Test IX.—Divide 30 by the time take in sorting the cards recorded in minutes.

On this basis the following table is formed from the data given in the several tests:

Summation of Points. (See Fig. 13.)

Test	6	7	8	9	10	11	12	13	14
1	3.3	4.2	4.3	4.9	5.0	5.7	5.7	6.1	6.4
2	4.4	4.9	5.5	5.7	5.6	5.8	6.0	6.1	6.4
3	3.9	4.0	4.3	4.5	4.5	4.7	5.1	5.6	6.0
4	3.6	5.2	6.6	8.0	8.8	10.6	11.2	13.6	15.0
5	4.2	4.7	5.9	7.4	7.4	9.1	10.7	10.0	10.7
6	4.8	4.7	5.5	5.5	5.4	6.9	7.8	7.8	8.6
7	1.5	3.0	4.8	6.0	9.3	11.4	12.4	14.1	15.9
8	3.2	4.3	5.6	6.8	7.7	11.2	12.4	13.8	15.4
9	4.4	5.4	6.8	6.3	7.0	7.9	8.1	8.8	9.0
	33.3	40.0	48.8	55.1	60.6	73.3	79.4	85.9	93.4

By use of interpolation the following table has been constructed from the norms given above and serves the purpose of quickly estimating the ages to a tenth of a year.

No. Points	Ment. Age	No. Points	Ment. Age	No. Points	Ment. Age	No. Points	Ment. Age
33.3	6.0	48.4	8.0	60.6	10.0	79.4	12.0
34.0	6.1	49.1	8.1	61.9	10.1	80.1	12.1
34.7	6.2	49.7	8.2	63.1	10.2	80.7	12.2
35.4	6.3	50.4	8.3	64.4	10.3	81.4	12.3
36.1	6.4	51.1	8.4	65.7	10.4	82.0	12.4
36.9	6.5	51.8	8.5	67.0	10.5	82.7	12.5
37.6	6.6	52.4	8.6	68.2	10.6	83.3	12.6
38.3	6.7	53.1	8.7	69.5	10.7	84.0	12.7
39.0	6.8	53.8	8.8	70.8	10.8	34.6	12.8
39.7	6.9	54.4	8.9	72.0	10.9	85.3	12.9
40.4	7.0	55.1	9.0	73.3	11.0	85.9	13.0
41.2	7.1	55.7	9.1	73.9	11.1	86.7	13.1
42.0	7.2	56.2	9.2	74.5	11.2	87.4	13.2
42.8	7.3	56.8	9.3	75.1	11.3	88.2	13.3
43.6	7.4	57.3	9.4	75.7	11.4	88.9	13.4
44.4	7.5	57.9	9.5	76.4	11.5	89.7	13.5
45.2	7.6	58.4	9.6	77.0	11.6	90.4	13.6
46.0	7.7	59.0	9.7	77.6	11.7	91.2	13.7
46.8	7.8	59.5	9.8	78.2	11.8	91.9	13.8
47.6	7.9	60.1	9.9	78.8	11.9	92.7	13.9
						93.4	14.0

THE BINET-SIMON SCALE

AND THE

YERKES POINT SCALE

A COMPARATIVE STUDY BASED ON THE EXAMINATION OF 100 CASES

JOSEPH ZIMMERMAN

College of the City of New York

In the discussion of the reliability of these two scales as means of measuring the intelligence of children, it is assumed that the readers are acquainted with the nature of the scales and the methods of giving the tests.[1] The examination of the one hundred cases for this experiment was made by the writer personally so as to eliminate any possible error that might arise from variation of method by different examiners. The great majority of the examinations were conducted in the Educational Clinic of the College of the City of New York, of which Dr. Samuel B. Heckman is the Director. Some of the examinations were made at the office of the Director of Ungraded Classes of New York. All tests were made under very favorable conditions of environment. The rooms were pleasant, and secluded enough to exclude most of the distracting elements. As a rule in order to eliminate any possible means of distraction for the subject no third person was permitted to witness the examination. Before the tests were given the child was first permitted to work with picture puzzle boards or in the case of very young children was given pictures to look at. This was done in order to establish a perfect *rapport* with the child. After the child was somewhat acquainted with the new surroundings the examination was begun.

Both tests, that is the Binet-Simon and the Point Scale tests, were given at one sitting. The sex and language norms furnished by Prof. Yerkes on page 73 of his book were used. Chart I gives the results obtained from one hundred children examined by the

[1] The Binet-Simon Scale used was that known as the 1911 revision translated by Dr. Clara H. Town, and recommended for clinical use by the conference held at Buffalo in 1914 in connection with the International Congress for School Hygiene. The Point Scale used was that given by Professor Yerkes in his book: *A Point Scale for Measuring Mental Ability.*

Binet-Simon Tests and the Point Scale Tests. All the children attend or at one time attended the public schools. Some of them were in the ungraded class—indicated by a star in front of their number. Each case was numbered so as not to disclose the name. The cases are arranged in the order of increasing chronological age from six to sixteen years. The first column in Chart I gives the case number, the second the sex (M stands for masculine and F for feminine), the third gives the grouping according to language. The letter E in this column means that the child is of English-speaking parents. The letters N. E. mean that the child is of non-English-speaking parents. The fourth column gives the chronological age of the child. The fifth column gives the number of points scored by the child in the Point Scale Tests. The sixth column gives the number of points that a child should score according to its chronological age, or according to the norm for its age. The seventh column gives the coefficient of intellectual ability (C. of I. A.) obtained by dividing the number of points scored in the Point Scale tests by the norm (number of points) for the chronological age, in other words it is the number in the fifth column divided by the number in the sixth column. Column eight gives the mental age of the child in years calculated from the Point Scale norms. Column nine gives the mental age in years according to the Binet tests. Column ten gives the Point Scale status, that is the relationship existing between the chronological age and the mental age. For example a plus 1.5 means that according to the Point Scale tests the child is 1.5 years above normal, a minus 1.5 means that according to the Point Scale the child is 1.5 years below normal. A zero in that column indicates that the mental age according to the Point Scale and the chronological age of the child are the same. Column eleven gives the Binet status, that is the relationship existing between the mental age of the child according to the Binet Scale and the chronological age. The same method of marking is used as in the Point Scale status. Column twelve gives the status difference, that is the difference between the Point Scale status and the Binet-Simon Status. It is found by subtracting the Point Scale status from the Binet status or vice versa. A star in front of any case number indicates that the case was in an ungraded class at the time of examination.

CHART I.

Results of One Hundred Cases Examined by the Binet Scale and the Point Scale

Case No.	Sex	Language	Chron. Age	P. S. Score	P. S. Norm	Coef. I. A.	P. S. Age	Binet Age	P. S. Stat.	Binet Stat.	Status Diff.
46	M	E	6.7	46	33	1.40	8.2	8.6	+1.5	+1.9	.4
76	M	E	7.1	23	33	.69	5.3	6.0	—1.8	—1.1	.7
100	F	NE	7.2	44	30	1.46	8.6	7.8	+1.4	+ .6	.8
82	M	E	7.5	39	33	1.05	7.6	7.6	+ .1	+ .1	0
44	M	NE	7.5	30	32	.93	6.7	6.8	— .8	— .7	.1
89	F	NE	7.7	26	32	.81	5.6	6.4	—2.1	—1.3	.8
38	F	NE	7.8	33	32	.85	7.1	6.8	— .7	—1.0	.3
78	M	E	8.2	31	43	.72	6.5	6.0	—1.7	—2.2	.5
3	M	NE	8.3	25	39	.64	6.0	6.0	—2.3	—2.3	0
51	F	NE	8.3	24	32	.75	5.3	6.6	—3.0	—1.7	1.3
69	M	E	8.7	59	56	1.05	9.3	9.2	+ .6	+ .5	.1
*52	M	NE	9.0	30	46	.65	6.7	6.6	—2.3	—2.4	.1
*18	M	NE	9.0	38	46	.82	7.9	8.4	—1.1	— .6	.5
*22	F	NE	9.3	43	51	.84	8.5	8.6	— .8	— .7	.1
5	M	NE	9.8	53	58	.91	9.6	9.6	— .2	— .2	0
8	M	NE	10.0	43	64	.67	8.0	8.0	—2.0	—2.0	0
*91	M	E	10.0	55	64	.86	8.9	8.4	—1.1	—1.6	.5
61	M	NE	10.3	64	58	1.10	11.6	12.2	+1.3	+1.9	.6
*21	M	E	10.3	15	64	.25	4	5.4	—6.3	—4.9	1.4
81	M	E	10.6	84	66	1.27	14.0	12.0	+3.4	+1.4	2.0
47	M	E	10.7	49	66	.74	8.5	8.8	—2.2	—1.9	.3
98	M	NE	10.7	61	61	1.00	11.0	9.8	+ .3	— .9	1.2
74	M	E	10.8	74	66	1.12	11.9	10.4	+1.1	— .4	1.5
90	M	NE	10.9	55	61	.90	9.7	9.4	—1.2	—1.5	.3
85	M	NE	10.9	50	61	.82	9.3	10.0	—1.6	— .9	.7
6	M	E	11.0	60	66	.90	9.5	9.4	—1.5	—1.6	.1
*32	F	E	11.0	32	63	.50	6.2	7.8	—4.8	—3.2	1.6
99	M	E	11.0	56	66	.85	9.0	9.0	—2.0	—2.0	0
66	M	E	11.3	66	66	1.00	11.0	9.8	— .3	—1.5	1.2
70	M	NE	11.3	53	61	.87	9.6	9.2	—1.7	—2.1	.4
88	M	NE	11.5	92	66	1.39	15	14.6	+3.5	+3.1	.4
71	M	E	11.7	68	75	.91	11.2	10.2	— .5	—1.5	1.0
28	M	E	11.7	65	75	.86	10.5	10.0	—1.2	—1.7	.5
31	F	NE	11.7	51	68	.75	9.0	9.4	—2.7	—2.3	.4
43	M	E	12.0	64	75	.85	10.0	10.0	—2.0	—2.0	0
25	M	NE	12.0	69	66	1.04	13.1	10.0	+1.1	—2.0	3.1
97	M	E	12.0	57	75	.76	9.1	9.6	—2.9	—2.4	.5
*24	M	NE	12.3	56	66	.84	9.8	9.6	—2.5	—2.7	.2
62	M	NE	12.4	61	66	.92	11.0	9.6	—1.4	—2.8	1.4
63	M	E	12.6	84	82	1.02	14.0	12.0	+1.4	— .6	2.0
77	M	E	12.6	62	82	.76	9.7	10.0	—2.9	—2.6	.3
40	M	E	12.6	51	82	.62	8.6	9.0	—4.0	—3.6	.4
39	M	E	12.7	40	82	.48	7.7	8.0	—5.0	—4.7	.3
30	F	E	13.0	66	77	.85	11.2	9.8	—1.8	—3.2	1.4
9	M	NE	13.0	51	68	.75	9.4	9.2	—3.6	—3.8	.2
*17	M	E	13.0	59	82	.71	9.4	9.2	—3.6	—3.8	.2
26	M	NE	13.0	71	68	1.02	13.5	10.2	+ .5	—2.8	3.3
2	M	E	13.0	83	82	1.00	13.5	14.6	+ .5	+1.6	1.1
49	M	E	13.0	75	82	.91	12.0	10.4	—1.0	—2.6	1.6
*67	M	E	13.0	44	82	.54	8.0	8.2	—5.0	—4.8	.2
35	M	E	13.0	81	82	.99	12.8	12.2	— .2	— .8	.6
64	M	NE	13.0	44	68	.65	8.7	8.6	—4.3	—4.4	.1
56	M	NE	13.4	65	68	.95	11.8	10.2	—1.6	—3.2	1.6

CHART I.—Continued.

Case No.	Sex	Language	Chron. Age	P. S. Score	P. S. Norm	Coef. I. A.	P. S. Age	Binet Age	P. S. Stat.	Binet Stat.	Status Diff.
45	F	NE	13.5	51	75	.68	9.0	9.4	—4.5	—4.1	.6
60	M	NE	13.5	76	68	1.11	14.5	11.6	+1.0	—1.9	2.9
59	M	E	13.6	74	84	.88	11.9	11.8	—1.7	—1.8	.1
83	M	E	13.6	94	84	1.12	15	14.6	+1.4	+1.0	.4
37	M	NE	13.6	64	74	.87	11.6	10.0	—2.0	—3.6	1.6
27	M	E	13.6	86	84	1.02	15.0	12.2	+1.4	—1.4	2.8
42	M	NE	13.6	56	74	.75	9.8	10.2	—3.8	—3.4	.4
11	M	E	13.7	85	84	1.01	14.5	11.8	+ .8	—1.9	2.7
50	M	NE	13.7	80	74	1.08	15	10.8	+1.3	—2.9	4.2
33	M	E	13.8	64	84	.76	10.0	10.0	—3.8	—3.8	0
58	M	NE	13.8	67	74	.90	12.5	10.2	—1.3	—3.6	2.3
80	M	NE	13.8	62	74	.83	11.2	11.8	—2.6	—2.0	.6
20	M	NE	13.8	58	74	.78	10.0	9.6	—3.8	—4.2	.4
13	M	E	14.0	38	84	.45	7.5	7.8	—6.5	—6.2	.3
72	M	NE	14.0	56	74	.76	9.8	10.0	—4.2	—4.0	.2
36	M	NE	14.0	58	74	.78	10.0	9.8	—4.0	—4.2	.2
*16	M	NE	14.0	64	74	.86	11.6	9.2	—2.4	—4.8	2.4
4	M	NE	14.1	42	74	.56	8.4	8.0	—5.7	—6.1	.4
1	M	E	14.3	80	84	.95	12.7	12.2	—1.6	—2.1	.5
87	M	NE	14.4	64	74	.86	11.6	11.6	—2.8	—2.8	0
*23	M	NE	14.5	49	74	.66	9.2	8.8	—5.3	—5.7	.4
*19	M	E	14.5	73	84	.86	11.8	10.2	—2.7	—4.3	1.6
34	M	E	14.6	91	86	1.05	15	12.4	+ .4	—2.2	2.6
86	M	E	14.6	74	86	.86	11.9	11.6	—2.7	—3.0	.3
54	M	E	14.6	43	86	.50	8.0	8.8	—6.6	—5.8	.8
7	M	E	14.7	68	86	.79	11.2	10.4	—3.5	—4.3	.8
94	M	E	14.7	92	86	1.06	15	12.4	+ .3	—2.3	2.6
96	M	E	14.7	71	86	.82	11.5	12.0	—3.2	—2.7	.5
65	M	NE	14.8	58	78	.73	11.8	10.0	—3.0	—4.8	1.8
79	M	NE	14.9	54	78	.69	9.7	9.6	—5.2	—5.3	.1
10	M	NE	15.0	57	78	.73	9.9	9.4	—5.1	—5.6	.5
29	M	E	15.0	57	86	.66	9.1	9.4	—5.9	—5.6	.3
15	M	NE	15.0	78	78	1.00	15.0	11.8	0.0	—3.2	3.2
75	M	E	15.1	80	86	.93	12.7	12.2	—2.4	—2.9	.5
68	M	E	15.2	88	86	1.02	15	14.6	0.0	— .6	.6
93	M	E	15.2	71	86	.82	11.5	11.6	—3.7	—3.6	.1
84	M	E	15.4	59	86	.69	9.4	9.8	—6.0	—5.6	.4
92	M	E	15.4	73	86	.85	11.8	12.0	—3.6	—3.4	.2
95	M	E	15.4	78	86	.91	12.4	12.2	—3.0	—3.2	.2
14	M	E	15.5	72	86	.84	11.3	10.4	—4.2	—5.1	.9
55	M	E	15.5	75	86	.87	12.0	12.2	—3.5	—3.3	.2
57	M	NE	15.5	71	78	.91	13.6	10.2	—1.9	—5.3	3.4
12	M	NE	15.5	80	78	1.02	15	11.8	+ .5	—3.7	3.2
41	M	E	15.7	82	86	.95	13.0	12.0	—2.7	—3.7	1.0
53	M	E	15.8	74	86	.86	11.9	10.4	—3.9	—5.4	1.5
73	M	E	16.0	76	86	.88	12.1	12.0	—3.9	—4.0	.1
48	M	NE	16.0	65	80	.80	11.8	12.0	—4.2	—4.0	.2

The one hundred cases whose data is furnished in Chart I may be divided for purposes of discussion into three groups, viz.:

1. Those sent by teachers or principals of the public schools;
2. Those sent by the Bureau of Attendance;
3. Those sent by parents.

The first group includes those children who failed to make satisfactory progress in the regular grades and were sent for examination to ascertain whether it would be advisable to place them in an ungraded class. This group also includes children who at the time of the examination were in an ungraded class. They were examined to determine whether they were fit to return to the regular grades. The second group includes children who are truants. They were examined in order to ascertain their mental status. Those who were found to be feeble-minded were recommended for an ungraded class, those who were normal were held responsible for their truancy and were either put on parole or committed to a truant school. The third group includes those children sent by their parents because of irregularities in behavior and unsatisfactory mental progress. A great many more tests than the Binet-Simon and the Point Scale were given in making a diagnosis, but these are omitted from this paper. The great majority of the cases examined belong to the first and second groups mentioned. Bearing this in mind one will understand why so many cases fall below their chronological age in both of the tests and also why so few cases measure up to normal.

A survey of columns ten and eleven in Chart I which give the Point Scale status and the Binet Status shows that from the ages seven years to ten years inclusive five individuals are rated by both tests as above age and fourteen individuals are rated as below age. The mental retardation in years according to the Binet Scale ranges from .1 to 6.2; according to the Point Scale tests from .1 to 6.6 years. From eleven to sixteen years inclusive, 4 individuals are rated above age and 77 below age by the Binet Tests whereas by the Point Scale tests 16 individuals are rated above age, 2 are rated as of normal age and 63 individuals are rated as below age. The mental retardations expressed in years, from eleven to sixteen years inclusive according to the Binet Tests, range from .4 to 6.2; according to the Point Scale tests from .2 to 6.6 years. These results indicate that the Binet Tests are a reliable means of determining the mentality of chil-

CHART II.

Analysis of the 100 cases giving the age difference according to the Binet Scale and the Point Scale, also the Binet Intelligence Quotient and the Point Scale Coefficient of Intellectual Ability

7 Years				8 Years				9 Years				10 Years				11 Years			
Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.
+1.9	+1.5	1.28	1.40	—1.3	—2.1	.83	.81	+ .5	+ .6	1.06	1.05	— .2	— .2	.98	.91	+1.4	+3.4	1.13	1.27
—1.1	—1.8	.84	.69	—1.0	— .7	.87	.85	—2.4	—2.3	.73	.65	—2.0	—2.0	.80	.67	—1.9	—2.2	.82	.74
+ .6	+1.4	1.08	1.46	—2.2	—1.7	.73	.72	— .6	—1.1	.93	.82	—1.6	—1.1	.84	.86	— .9	+ .3	.91	1.00
+ .1	+ .1	1.01	1.05	—2.3	—2.3	.72	.64	— .7	— .8	.92	.84	+1.9	+1.3	1.18	1.10	— .4	+1.1	.96	1.12
— .7	— .8	.90	.93	—1.7	—3.0	.79	.75					—4.9	—6.3	.52	.23	—1.5	—1.2	.86	.90
																— .9	—1.6	.91	.82
																—1.6	—1.5	.85	.90
																—3.2	—4.8	.71	.50
																—2.0	—2.0	.82	.85
																—1.5	— .3	.87	1.00
																—2.1	—1.7	.81	.87
																+3.1	+3.5	1.27	1.39

12 Years				13 Years				14 Years				15 Years				16 Years			
Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.	Bin. Yrs. + −	P. S. Yrs. + −	Bin. I. Q.	P. S. C.I.A.
—1.5	— .5	.87	.91	—. 6	+1.4	.95	1.02	—1.8	—1.7	.86	.88	—2.2	+ .4	.85	1.05	—3.7	—2.7	.76	.95
—1.7	—1.2	.85	.86	—2.6	—2.9	.79	.76	+1.0	+1.4	1.07	1.12	—3.0	—2.7	.79	.86	—5.4	—3.9	.66	.86
—2.3	—2.7	.80	.75	—3.6	—4.0	.71	.62	—3.6	—2.0	.73	.87	—5.8	—6.6	.60	.50	—4.0	—3.9	.75	.88
—2.0	—2.0	.83	.85	—4.7	—5.0	.63	.48	—1.4	+1.4	.89	1.02	—4.3	—3.5	.70	.79	—4.0	—4.2	.75	.80
—2.0	+1.1	.83	1.04	—3.2	—1.8	.75	.85	—3.4	—3.8	.75	.75	—2.3	+ .3	.84	1.06				
—2.4	—2.9	.80	.76	—3.8	—3.6	.70	.75	—1.9	+ .8	.86	1.01	—2.7	—3.2	.81	.82				
—2.7	—2.5	.78	.84	—3.8	—3.6	.70	.71	—2.9	+1.3	.77	1.08	—4.8	—3.0	.67	.73				
—2.8	—1.4	.77	.92	—2.8	+ .5	.79	1.02	—3.8	—3.8	.72	.76	—5.3	—5.2	.64	.69				
				+1.6	+ .5	1.12	1.00	—3.6	—1.3	.74	.90	—5.6	—5.1	.62	.73				
				—2.6	—1.0	.80	.91	—2.0	—2.6	.85	.83	—5.6	—5.9	.62	.66				
				—4.8	—5.0	.63	.54	—4.2	—3.8	.69	.78	—3.2	0.0	.78	1.00				
				— .8	— .2	.94	.99	—6.2	—6.5	.56	.45	—2.9	—2.4	.81	.93				
				—4.4	—4.3	.66	.65	—4.0	—4.2	.71	.76	— .6	0.0	.95	1.02				
				—3.2	—1.6	.76	.95	—4.2	—4.0	.70	.78	—3.6	—3.7	.76	.82				
				—4.1	—4.5	.69	.68	—4.8	—2.4	.66	.86	—5.6	—6.0	.63	.69				
				—1.9	+1.0	.85	1.11	—6.1	—5.7	.57	.56	—3.4	—3.6	.77	.85				
								—2.1	—1.6	.85	.95	—3.2	—3.0	.79	.91				
								—2.8	—2.8	.80	.86	—5.1	—4.2	.67	.84				
								—5.7	—5.3	.54	.66	—3.3	—3.5	.79	.87				

dren who are ten years of age or below. After ten years the Binet-Simon results are not very reliable. This is to be expected since there are no tests for eleven, thirteen and fourteen years.

A survey of the last column of Chart I, which gives the status difference, shows that in eight cases the results of both scales were identical, in twenty additional cases the results did not differ more than by two tenths (.2) of a year, in twenty-eight additional cases the results did not differ more than by five-tenths (.5) of a year, and in thirteen additional cases the results did not differ more than by one year. The greatest difference in the results of the two scales was for the years eleven to sixteen inclusive. Chart II analyzes the 100 cases under their respective age groups, giving the age difference of each case according to the Binet Scale and the Point Scale, and the Binet Intelligence Quotient and the Point Scale Coefficient of Intellectual Ability.

Chart III summarizes the results of the 100 cases as they appear in Chart II. The results are listed under each year. It should be noted that seven years includes the ages 6.6 to 7.5 years, eight years includes the ages 7.6 to 8.5 years, etc. Under each year there are three columns. The first column gives the number of individuals rated as advanced, the second column gives the number of individuals rated as normal, the third column gives the number of individuals rated as retarded. At the end of each group is given the average departure from age according to both tests.

CHART III

Results of 100 Cases Examined by the Binet-Simon Scale and the Point Scale

	7 Years			8 Years			9 Years			10 Years			Average Departure from Age	
	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Positive	Negative
Binet Scale	3	0	2	0	0	5	1	0	3	1	0	4	1.00	1.62
Point Scale	3	0	2	0	0	5	1	0	3	1	0	4	.98	1.87

	11 Years			12 Years			13 Years			14 Years			15 Years			16 Years			Average Departure from Age	
	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Ad.	Norm.	Ret.	Positive	Negative
Binet Scale	2	0	10	0	0	8	1	0	15	1	0	19	0	0	21	0	0	4	1.77	3.08
Point Scale	4	0	8	1	0	7	4	0	12	4	0	16	3	2	16	0	0	4	1.22	3.12

Chart III further indicates what was said before, namely that the findings of the two scales run parallel till the age of ten. Hence we may assume that both scales are reliable till that age. Chart IV combines the results of the 100 cases irrespective of age.

CHART IV.

Results of 100 Cases Examined by the Binet-Simon Scale and the Yerkes Point Scale

	Advanced	Normal	Retarded	Average Departure from Age: Positive	Average Departure from Age: Negative
Binet.....	9	0	91	1.34	2.86
Point Scale.....	21	2	77	1.16	2.89

The conclusions to be drawn from the comparison of the two scales are:

1. That the results are practically identical for the first ten years.

2. That the reliability and fairness of the Binet Scale greatly decreases after the tenth year.

3. That the reliability and fairness of the Point Scale continue and therefore the Point Scale demonstrates its superiority over the Binet Scale for at least four years beyond the point where the reliability of the Binet Scale ceases.

Where the results of both scales agree, the examiner with considerable degree of certainty may feel that the mental age of the child as determined by the two scales is correct, where the results of both scales differ to any marked extent, this divergence of results may serve two valuable purposes: first, it prevents over hasty conclusions on the part of the examiner, and, secondly, it makes clear the need of supplementary tests before a definite diagnosis is made.

AN ANNOTATED BIBLIOGRAPHY OF RECENT LITERATURE ON THE BINET–SIMON SCALE (1913–1917). PART III.

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A survey of the Chicago situation with suggestions as to ways out.

317. RAPEER, L. W.: *School Health Administration.*
N. Y.: Teachers College, Columbia Univ. 1913, 360 p.
The use of tests for school health administration.

318. REDFIELD, C. L.: *Education and Inheritance.*
J. of Educ. 1916, 84: 649–650.
A discussion of the relation between intellectual ability of parents in or near the border zone, their mental progress, and the combined effects of these upon filial variation.

319. RENZ, EMILIE: *A Study of the Intelligence of Delinquents and the Eugenic Significance of Mental Defect.*
Traing. School Bull. 1914, 11: 37–39.
One hundred girls in the Ohio reformatory examined, ages 11 to 18. Fifty-eight percent found feeble-minded, 36 percent being given as the conservative figure.

320. *Report of Mental Examinations.* New York: N. Y. Probation and Protective Assoc. 1914, 6 p.

321. RICHARDS, W. M.: *Is the Ungraded Child Necessarily Feeble-minded?*
Ungraded 1916, 1: 139–141.
None of us knows much about feeble-mindedness, ergo: why depend on the scale?

322. ROGERS, A. C.: *Classification of the Feeble-minded Based on Mental Age.*
Bull. Amer. Acad. of Med., 1912, 13: 135–144.
Indicates change made in treatment based on change of classification.

323. ROGERS, AGNES L., AND MCINTYRE, J. L.: *The Measurement of Intelligence in Children by the Binet-Simon Scale.*
Brit. J. of Psychol. 1914, 7: 265–299.
An excellent discussion. Two hundred and seventeen Scottish children between 4 and 14 examined. Comparisons made between results from 1908 and 1911.

324. ROSANOFF, A. J.: *Preliminary Report of a Higher Scale of Mental Measurement.*
N. Y. State Hospital Bull. Nov., 1914, 10 p.
An association test series to indicate the progress of individual specialization.

325. ROSSY, C. S.: *Report of the First Three Hundred Cases Examined at the Massachusetts State Prison.*
Bull. No. 17, Mass. State Bd. of Insanity, Jan., 1916, pp. 4–20.
The application of the point scale to prison inmates.

326. ROSSY, C. S., AND SAWYER, M. H.: *Comparison of Mental Gradings by the Yerkes-Bridges Point Scale and the Binet-Simon Scale.*
Ped. Sem., 1916, 23: 452–467.
Between ages 4 and 9, year scale grades higher, after that lower. Greatest variation between the scales at the two extremes. The two scales *exactly* coincide in only 4 percent of the cases.

327. ROWE, E. C.: *Five Hundred Forty-seven White and Two Hundred Sixty-eight Indian Children Tested by the Binet-Simon Tests.*

Ped. Sem. 1914, 21: 454–468.

Comparison of results obtained by the 1908 and 1911 scales show no marked differences. Indians inferior to whites, and the difference is greater between white and Indian than between white and colored as tested by Morse and Strong. "Indians are everywhere inferior to the whites."

328. RUTTMANN, W. J.: *Quellen and Methoden der Schülerkunde.*
Zsch. f. pädagog. Psychol. 1915, 16: 335–342.
An historical resume of sources and methods of child study.

329. SAFFIOTTI, F. U.: *L'Opera di Zaccaria Trèves e la psicologia sperimentale.*
Milano 1912, 28p.
The work of Trèves discussed.

330. SAFFIOTTI, F. U.: *Contributo allo studio dei rapporti tra l'intelligenza e i fattori biologico-sociali nella scuola.*
Rivista di Antropologia 1913, 18: 34 p.
A study of biological and social factors as causes for differences in intelligence level.

331. SAFFIOTTI, F. U.: *Note Psicologice su due Gemelle.*
Rivista di Antropol. 1913, 18: 11 p.
A comparative study and analysis of the intelligence of twins.

332. SAFFIOTTI, F. U.: *Sul "Quoziente d'Intelligenza."*
Rivista di Antropol. 1914, 19: 10 p.
Not ready to accept the "intelligence quotient" as an index of mental development.

333. SAFFIOTTI, F. U.: *La misura dell'intelligenza nei fanciulli.*
Roma: Societa Romana di Antropologia, 1916, 286 p.
Among the best and the few thorough analyses of the scale. A discussion of all of Binet's, the Vineland and the Italian revisions, is included. (For an excellent review of this book, see Cyril Burt, Eugenics Review, 1917, 8: 365–373.)

334. SANDIFORD, PETER: *Child Study and the Teacher.*
Child, 1914–4: 792–96.

335. SCHLAPP, M. G.: *Recent Progress in Dealing with Feeble-minded and Mentally Defective Dependent Children.*
J. of Psycho-Asthen. 1915, 19: 175–186.
"There are a number of workers who think that by giving the Binet test and determining that an individual falls two years or so below the normal standards, an accurate diagnosis of feeble-mindedness is attained. I should like very earnestly to warn against such procedure."

336. SCHLESINGER, E.: *Die Intelligenzdekeft der schwachbegabten Schulkinder.*
Zsch. f. d. ges. Neurol. u Psychiatr. 1913, 15: 564–577.
A detailed study of 49 cases, with a consideration of the progress of mental development in defectives.

337. SCHLESINGER, E.: *Schwachbegabte Kinder.*
Archiv. f. Kinderheilk. 1913, Heft 1. Also, Stuttgart: F. Enke, 1913, 131 p.
The value of the scale for purposes of classification.

338. SCHMITT, CLARA: *Standardization of Tests for Defective Children.*
Psychol. Monogr. 1915, Vol. 19, No. 3, 181 p.
An outline of the historical development of tests for mental measurement, and a discussion of the scale, its "fallacies and inadequacies."

339. SCHREUDER, A. J.: *Some Dutch Experiences with the Binet Scale.*
Fourth Intern. Congr. on Sch. Hyg., Buffalo, 1913, Vol. V, pp. 690–692.
The value of the scale for international application.

340. SCHULHOF, F.: *Intelligenzprüfung.*
Zsch. f. d. ges. Neurol. u. Psychiat. 1915, 28: 276–291.
Interesting suggestions.

341. SCHWEGLER, R. A.: *A Teachers' Manual for the Use of the Binet-Simon Scale of Intelligence.*
Topeka, Kansas 1914, 56 p.
Contains an account of the scale, with directions for its application.

342. SEASHORE, C. E.: *Mentality Tests: A Symposium.* (See earlier reference).
J. Educ. Psychol. 1916, 7: 163–166, 229.
Stimulated by a letter from Dr. Yerkes, Dr. Seashore suggests the advisability of a symposium on the subject of mental tests. Outlines some problems requiring consideration.

343. SHUTTLEWORTH, G. E., AND POTTS, W. A.: *Mentally Deficient Children* (4th edition).
London: H. K. Lewis & Co., Ltd. 1916.
One section on "Tests of Intelligence."

344. SIMON, TH.: *The Measurement of Intelligence.*
Eugenics Rev. 1914–1915, 6: 291–307.
A review of the development of the scale and a short explanation of its utility.

345. SIMPSON, B. R.: *Correlations of Mental Abilities.*
Teachers' College, Columbia Univ. Contrib. to Educ. No. 53. N. Y. City: Teachers' College 1912, 122 p.
Speaks of the scale as one of a system of tests from which results of practical educational value may be expected.

346. SINCLAIR, H. W.: *Classification of Mentally Defective Children from the Administrative Aspect.*
Child 1915, 6: 18–24.
The Binet Scale used in the selection of children for special classes under the Mental Deficiency Act.

347. SKINNER, C. E.: *Point Scale Ratings of Ninety-three Dependent Children.*
Psychol. Clinic 1916, 10: 168–174.
Compares the 3 percent hypothesis of feeble-mindedness suggested by Pintner and Paterson with the 2 and 3 years backwardness standard or Goddard (Binet). Finds the former more reliable. By this means, 15 percent are feeble-minded, 62.3 percent backward, 19.3 percent normal, 2.1 percent bright. Also utilizes the I. Q. of 75 as dividing line between normality and feeble-mindedness.

348. SMITH, M. H.: *The Binet-Simon Method and the Intelligence of Adult Prisoners.*
Lancet 1915, Vol. CLXXXIX.
An experiment in testing adult prisoners. Concludes that the Binet scale is a valuable means of estimating intelligence, but should be modified for adults.

349. SMITH, H. L.: *Plans for Organizing School Surveys.*
13th yr. bk. Nat. Soc. for Study of Educ. 1914, pp. 7–68. Chicago: Univ. of Chicago Press 1914.
Suggests the use of the scale in school surveys to help discover the actual efficiency of pupils.

350. SMITH, STEVENSON: *First Annual Report of the Bailey and Babette Gatzert Foundation for Child Welfare.*
Bull. Univ. of Wash. No. 60, 1912, 15 p.
Program and methods of the Department of Diagnosis.

351. SMITH, THEODATE L.: *The Development of Psychological Clinics in the United States.*
Ped. Sem. 1914, 21: 143–153.
Binet testing as one of the chief diagnostic methods.

352. SMITH, THEODATE L.: *Childhood.*
Psychol. Bull. 1913, 10: 377–397.
An excellent discussion of the year's contributions in the field of Binet testing.

353. SPAULDING, EDITH R.: *The Results of Mental and Physical Examinations of Four Hundred Women Offenders.*
J. Crim. Law and Criminol. 1914, 575: 704–717.
Sixteen and eight-tenths percent found feeble-minded, 36.7 percent found showing good or fair native ability. Correlates mental ability with school work, physical condition, and availability for institution labors.

354. SPEARMAN, C.: *The Heredity of Abilities.*
Eugenics Rev. 1914–5, 6: 219–237.
Speaks of the "relatively successful standardization of the Binet-Simon tests, although these are probably as far behind future tests as Fitch's steamboats were inferior to modern Atlantic liners."

355. SPEARMAN, C.: *The Measurement of Intelligence.*
Eugenics Rev. 1914–5, 6: 312–313.
Is dissatisfied with the statement that "the scale measures the intelligence as a whole without analyzing it." Insists that the scale measures a "constant factor, or general mental ability, or free energy of the whole cerebral cortex."

356. STEINBACH, CHARLOTTE: *The Examination of 1097 Children in the Public Schools of Cleveland, Ohio.*
Traing. School Bull. 1915, 12: 101–106.
Three hundred and fifty-eight were found feeble-minded. One hundred and ninety-one manifested a retardation of 3 years, and 212 of 2 years. Special class assignment made on the basis of the Binet data. Estimates between 2000 and 3000 feeble-minded in the Cleveland Public Schools.

357. STENQUIST, J. L., THORNDIKE, E. L., AND TRABUE, M. B.: *The Intellectual Status of Children Who Are Public Charges.*
Archives of Psychol. No. 33, Sept., 1915, 52 p.
Two hundred and sixty-five children studied. Correlations between the Binet and other tests are high.

358. STERN, W.: *The Psychological Methods of Testing Intelligence.* (Transl. by G. M. Whipple.)
Baltimore: Warwick & York 1914, 160 p.
See reference No. 203 in earlier bibliography.

359. STERN, W.: *Ueber Intelligenz-Stadien und -Typen beim Aussageversuch.*
Zsch. f. angew. Psychol. 1915, 10: 300–320.
A discussion of stages and types of individual differentiation.

360. STERN, W.: *Der Intelligenzquotient als Mass der kindlichen Intelligenz, insbesondere der unternormalen.*
Zsch. f. angew. Psychol. 1916, 11: 1–18.

A variation of 5 percent in I. Q. with developing age is not to be regarded as significant. After 12. I. Q. decreases, and loses its diagnostic value.

361. STEVENS, H. C.: *"The Individual Delinquent."*
J. Crim. Law & Criminol. 1915–6, 6: 849–859.
Agrees with Healy in not regarding the scale mature for "propaganda." Finds the Point Scale of decided superiority.

362. STEVENS, H. C.: *Eugenics and Feeble-mindedness.*
J. Crim. Law and Criminol. 1915–16, 6: 190–197.
Attacks the validity of Goddard's data in "Feeble-mindedness: Its Causes and Consequences." (See earlier reference.)

363. STEVENS, H. C.: *A Survey of Retarded School Children.*
School Review 1916, 24: 450–461.
The Vineland revision and the point scale used. Thirty-three children examined. "In the opinion of the author the point-scale method is destined to supersede the Binet-Simon test."

364. STOCKTON, J. L.: *Exact Measurements in Education.*
Chicago and N. Y.: Row, Peterson and Co., 1915, 57 p.
An attempt to interpret reactions to the scale in the light of "time, force and space."

365. STORER, MARY: *The Defective Delinquent Girl.*
J. Psycho-Asthen. 1914, 19: 23–30.
Data from the Ohio Girls' Industrial School: 59% feeble-minded, 14% normal.

366. STREETER, WILLIAM C.: *Report of the Children's Commission to the Government and Legislature of the State of New Hampshire.*
Concord, N. H., Jan., 1915, pp. 71–102.
The first compete survey of a state, psychological tests being used in all suspicious cases to determine the incidence of feeble-mindedness. One percent of population mentally deficient.

367. STREETER, LILLIAN C.: *The Relation of Mental Defect to the Neglected, Dependent and Delinquent Children of New Hampshire.*
Nat. Conf. of Char. and Corr. 1915.

368. STRONG, E. K., JR.: *Correlation between the Binet-Simon Tests and Other Mental and Physical Tests.*
Paper read before Amer. Psychol. Assoc. 1914. (Abstracted in Psychol. Bull. 1915, 12: 70–71.)
High coefficients found between the Binet and other mental tests.

369. STRONG, E. K., JR.: *Effects of Hookworm Disease on the Mental and Physical Development of Children.*
N. Y.: Rockefeller Foundation, 1916, 121 p.
The scale used together with other tests to determine the effect of this disease upon mental development.

370. STUART, D. D. V., JR.: *Variability in the Results of Intelligence Tests.*
J. Amer. Med. Assoc. 1914, 63: 319–20.
Finds that the personal equations of different examiners produce serious variations in Binet diagnosis.

371. SWIFT, WALTER B.: *Some Developmental Psychology in Lower Animals and in Man and Its Contribution to Certain Theories of Adult Mental Tests.*
Amer. J. Psychol. 1916, 27: 71–86.
A few criticisms of intelligence scales, the Binet included.

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VOLUME VIII NOVEMBER, 1917 NUMBER 9

EDITORIAL

PSYCHOLOGY AND THE WAR

The conduct of a war in these modern times is a big task—how big we are just beginning to realize. Modern war is not merely the shock of battle, although all other activities lead up to this,—it is organization, transportation and utilization of resources. That our government seems to appreciate this is a matter for satisfaction. We have not been a warlike nation. We have paid little attention to the art of war. That we should make mistakes is to be expected. But the men at Washington seem disposed to profit by experience and to make use of all the expert advice they can obtain. Particularly encouraging is their recognition of the importance of psychological factors in military organization, and their readiness to make practical application of psychological technique.

In the matter of the draft, for example, the principle of universal liability to service is unquestionably sound and consistent with the principles of democracy. But the haphazard fashion in which the first contingent of the draft was selected gave rise to great inequalities of treatment and much discussion. It is now proposed that every registered man who has not yet been called to the colors shall

file with his local board a complete account of himself, including life-history, family, training, responsibilities, and economic value to the state. On the basis of this record the men will be divided into five classes. Class 1, composed of those who have no dependents and who are not engaged in important pursuits, will be called first until the entire class is exhausted. Class 2, involving men with small families, or those engaged in partly skilled occupations, will come next. Then will follow Class 3, highly skilled men or those with aged dependents, Class 4, men having large families or holding important positions, and Class 5, men in no way fitted for active service. Plans are being devised which will greatly facilitate the keeping of the records, the physical examination of the men (which will take place only after they are called), and the organization of the contingents.

The application of psychological tests to the men of the first contingent is proceeding apace in four of the cantonments. In each cantonment the work is in charge of four commissioned officers (psychologists) and six civilians, as follows:

Camp Devens, Ayer, Mass. First Lieutenants W. S. Foster, J. E. Anderson, H. B. English, J. T. Metcalf, civilians R. H. Wheeler, H. C. Bingham, C. R. Brown, C. E. Kellogg, R. S. Roberts, C. H. Toll.

Camp Dix, Wrightstown, N. J. First Lieutenants J. W. Hayes, H. A. Richmond, H. T. Manuel, C. C. Brigham, civilians T. H. Haines, N. J. Melville, H. P. Shumway, T. M. Stokes, J. J. B. Morgan, C. C. Stech.

Camp Lee, Petersburg, Va. First Lieutenants C. S. Yoakum, G. O. Ferguson, Jr., W. S. Hunter, E. S. Jones, civilians L. T. Brueckner, D. G. Paterson, A. S. Edwards, R. Pintner, B. F. Pittenger, B. D. Wood.

Camp Taylor, Louisville, Ky. First Lieutenants M. R. Trabue, K. T. Waugh, H. B. Cummings, E. A. Doll, civilians J. W. Bridges, J. Crosby Chapman, J. K. Norton, E. C. Rowe, J. D. Houser, and C. P. Stone.

The entire work is under the supervision of Major R. M. Yerkes, with Professor W. V. Bingham as civilian assistant. The aims of this testing are to furnish commanding officers with a list of the rating of each man in his command, by which he may, if he chooses, be guided in selecting men for promotion, or for special duties requiring more than average intelligence and mental quickness, to pick out those who are so deficient in intelligence as to require further psychiatric examination, and to determine special aptitudes and capacities.

Further, Professors Bingham, Scott, and others are at work on an occupational classification of recruits, Professors Angell and Scott are devising scales for the rating of officers, Professor Watson and assistants are working on problems of aviation, and Professor Dodge is studying the psychology of gun pointing and cognate problems in the handling of artillery. Thus it will be seen that psychology is giving of its best in the service of the nation.

J. C. B.

NOTES AND NEWS

The next annual meeting of the American Psychological Association, which was to have been held at Ann Arbor, will be held instead at Pittsburgh, December 27–29, 1917.

Extensive tests of the musical ability of fifth grade school children are being carried on under the supervision of Professor C. E. Seashore, of the University of Iowa. The fifth grade has been selected for these tests because in this grade the children are old enough to understand what is wanted of them and to coöperate in the testing, and still young enough to permit of a thorough education in music if the results of the tests indicate the presence of a considerable degree of ability. The tests have been introduced into several Iowa cities, and the schools of St. Louis. Last summer in connection with Professor Seashore's courses in the University of California large groups of children from Berkeley and San Francisco were examined, and teachers were trained in the use of the tests. If these tests can be given annually to selected groups of children for perhaps ten years, and the results of their musical training carefully followed up, we shall have a mass of material on the development of a specific ability that will be of the highest psychological and educational value.

Professor John B. Watson, of Johns Hopkins University, has accepted a commission in the United States Army with the rank of major for the purpose of applying psychological principles to the task of the selection of aviators. Dr. Watson will be assisted by a strong corps of psychologists and physiologists, and will endeavor to determine the characteristics of the successful aviator, and the most efficacious means of selecting promising candidates.

Professor James R. Angell, of the University of Chicago, has been granted a leave of absence from that institution to devote himself to the problem of selecting from the new national army those who should be withdrawn for special schooling to serve as officers.

Professor B. B. Breese, of the University of Cincinnati, desires to call attention to an error in his recently published text-book in psychology. In Fig. 29, opposite page 48, the lower and smaller blue area near the hippocampal convolution should be in purple instead of blue. The error was made in the process of engraving, and was discovered by the publisher only after the first lot of books had been issued.

Professor Bird T. Baldwin, head of the department of psychology and education at Swarthmore College and lecturer on education at Johns Hopkins University, has accepted the position of director of the Child Welfare Research Station, and research professor of educational psychology at the University of Iowa.

In the Chicago Public Schools Dr. Frank G. Bruner, of the Child Study department, has been appointed director of special schools.

Dr. David Allen Anderson, associate professor of education in the University of Washington, has been called to the headship of the department of education and psychology in the Pennsylvania State College.

Three Iowa college professorships in psychology for the current year have been filled by students from the graduate college of the State University of Iowa. Dr. Marie Agnew goes to Buena Vista, Dr. Merle Thompson goes to Morningside, and Dr. Nesta Williams has accepted a professorship at Central College.—*School and Society.*

Dr. Raymond H. Wheeler, instructor in psychology in the University of Oregon, has been promoted to an assistant professorship in that institution.

Dr. Arthur C. Fleshman, of Kentucky State University, has been appointed professor of education in the University of West Virginia.

Professor F. A. C. Perrine, assistant professor of psychology at the University of Pittsburgh, has accepted the position of adjunct professor of psychology at the University of Texas.

Dr. John F. Dashiell has been appointed instructor in psychology at Oberlin College.

PUBLICATIONS RECEIVED

ALFRED ADLER. *The Neurotic Constitution. Outlines of a Comparative Individualistic Psychology and Psychotherapy.* Authorized translation by Bernard Glueck and John E. Lind. New York: Moffat, Yard and Company, 1917. Pp. xxvi, 456. $3.00.

The author divides his discussion into two parts. The first or theoretical part sketches the development of the feeling of inferiority, which is such a striking characteristic of the neurotic individual. Emphasis is laid on the principle of psychic compensation by which the neurotic subject endeavors to raise himself above and triumph over the felt inferiority; the accentuated fiction thus becomes systematized and idealized as a source of safety and security. Part two, which is called the practical part, gives a somewhat detailed account of the characteristic symptoms of neurotic subjects, as avarice, suspiciousness, envy, cruelty, and so on through the whole list of anomalies of disposition which a study of neurotics reveals. As the normal individual crystallizes his experiences into ideals, principles, standards of conduct, and thus gradually builds up his character, so the neurotic, oppressed by the ever present consciousness of his unworthiness, elaborates a complicated system of fictions, which in turn react upon every day experiences and frequently drive the subject to the meanest and most despicable types of conduct. Neurotics cling to these reassuring ideals with great tenacity, for to acknowledge their falsity would be to show one's self to the world in all one's miserable weakness. As the author says in conclusion "Inferior organs and neurotic phenomena are symbols of formative forces which strive to realize a self-conducted life-plan by means of intense efforts and expedients."

AUGUSTA F. BRONNER. *The Psychology of Special Abilities and Disabilities.* Boston: Little, Brown and Company, 1917. Pp. vii, 269. $1.75.

"In this book an attempt has been made to discuss practical aspects of special abilities and disabilities, to offer in detail methods of attacking problem cases, and to present various types, both (a) of particular disabilities in those who have normal general ability and (b) of particular abilities of those who are below normal in general capacities." The author states first the general method of procedure in reaching a diagnosis, discusses some general educational tendencies, and then gives a detailed account of individual cases exhibiting defects in number work, in language ability, in separate mental processes, and in mental control. There is one chapter on "Special Abilities with General Mental Sub-Normality." The author believes that the various means employed by schools to meet the situations caused by these individual disabilities, such as ungraded classes,

"floating teachers," promotion by subjects, are helpful but inadequate. We need a more careful and thorough educational diagnosis of the individual pupil and an adjustment of school tasks to fit his particular needs.

HENRY PRATT FAIRCHILD. *Outline of Applied Sociology.* New York: The Macmillan Company, 1916. Pp. x, 353. $1.75.

This book "concerns itself but little with questions of origins, and devotes itself to facts rather than to theories." The five parts of which the book is composed deal with the following topics: (1) Classification of social phenomena and types of abnormality, as immorality, sin, crime, vice, incapacity, maladjustment; (2) The normal aspects of economic life, including such ideas as natural liberty, competition, the relations between capital and labor, transportation, standards of living, economic abnormalities and their remedies; (3) The growth of population, involving a discussion of marriage, the family, divorce, sexual relations, the child, and schemes of betterment; (4) The esthetic, intellectual, and spiritual life; and (5) The dominance of the interests of society over those of any and all individuals. Very applicable is the pithy statement of Professor Sumner "If this poor old world is as bad as they say, one more reflection may check the zeal of the headlong reformer. It is at any rate a tough old world."

GEORGE GORHAM GROAT. *An Introduction to the Study of Organized Labor in America.* New York: The Macmillan Company, 1917. Pp. xv, 494. $1.75.

The topics considered in this excellent history are the beginnings of organized labor in England and America, modern industrialism, the history of such organizations as the Knights of Labor, the American Federation of Labor, the American Trade Union, and the attitude of women toward the unions. There are extended discussions of the strike, the boycott, the closed shop, arbitration, trade agreements, and the restriction of membership and output. The political activity of labor organizations is illustrated at some length and the transitional stages of industrial unionism and syndicalism are examined with reference to their influence on the future of organized labor. In view of the industrial readjustments that will follow the conclusion of peace this book deserves to be read and pondered by all interested in the employment of labor.

G. STANLEY HALL. *Jesus, the Christ, in the Light of Psychology.* New York: Doubleday, Page and Company, 1917. Volume I, pp. xix, 325. Volume II, pp. 326 to 733. $7.50.

In this imposing work we have not merely a psychologist's reaction to the fundamental problems of Christianity, but the results of a long life of sympathetic reflection upon and study of these problems. The argument of the volumes is not destructive of Christian

faith, but rather constructive and interpretive. The author says "I believe I can now repeat almost every clause of the Apostles' Creed with a fervent sentiment of conviction. My intellectual interpretation of the meaning of each item of it probably differs *toto caelo* from that of the average orthodox believer. To me not a clause of it is true in a crass, literal, material sense, but all of it is true in a sense far higher, which is only symbolized on the literal plane. The change from my boyhood belief in it all has been to me all gain and no loss.

JOHN A. LAPP AND CARL H. MOTE. *Learning to Earn. A Plea and a Plan for Vocational Education.* Indianapolis: The Bobbs-Merrill Company, 1915. Pp. 421. $1.25.

Both secondary and elementary education are still under the influence of humanistic formalism. The present book is designed to stir up popular interest in the reform of elementary education in the direction of better preparation for the business of living. For such a purpose novelty would be undesirable and we find a straightforward presentation of present tendencies and desirable ideals in vocationalizing education. The last chapter on the "Ideal School" stresses the social purpose of education and urges a corresponding socialization of the school procedure.

LAURA F. KREADY. *A Study of Fairy Tales.* Boston: Houghton Mifflin Company, 1916. Pp. xvii, 313.

The last decade has witnessed a noteworthy revival of interest in fairy tales as introductory material for the study of literature. Their use is advocated because of the pleasure they afford to children, because of the stimulus they give to the imagination, because they extend and intensify the child's social and moral ideas, and because they furnish convenient and flexible material for language training. The present book will be very useful to elementary teachers for its discussion of the principles of selection of fairy tales, its instruction in story telling, its presentation of the history of fairy tales, and its extensive lists of source materials. It is a book worth owning and studying.

THOMAS MOTT OSBORNE. *Society and Prisons.* New Haven, Conn.: Yale University Press, 1916. Pp. 246. $1.35.

This volume presents the author's "Yale Lectures on the Responsibilities of Citizenship" on the William Earl Dodge Foundation. Probably no one in this country has made more extensive investigations of prison conditions or has had a better opportunity to prove the absurdities of traditional penology. While it is undoubtedly true that striking advances have been made in the treatment of criminals, society is still in the grip of the barbaric idea that the criminal must suffer punishment. But from a social point of view the two things needful are, first, protection from the anti-social behavior of

the criminal, and second, the reform of the criminal into a productive and reliable citizen. The first of these ends is best attained by the scientific study of individuals who manifest anti-social tendencies before these develop to the criminal stage. By a proper education or segregation as wards of the state probably half of the crime now committed might thus be avoided. In cases of the actual conviction of crime the criminal should not only be deprived of his liberty as a punishment, but should immediately be studied to determine whether or no the capacity of social self-control may be developed. If it can, treatment should immediately be directed to the establishment of a proper attitude toward society, and the man instead of being a burden to the state should be put at productive labor under social guidance and direction. The present book will contribute no insignificant share to the realization of these ideals.

FREDERIC DEWITT WELLS. *The Man in Court.* New York: G. P. Putnam's Sons, 1917. Pp. vii, 283. $1.50.

The author, who is a justice of the municipal court of New York City, draws a humorous but vivid and enlightening picture of various phases of court procedure. Some of the scenes presented are A Night Court, The Civil Court, The Judge, The Anxious Jury, The Strenuous Lawyer, The Worried Client, The Confused Witness, The Heavy Charge, and The True Verdict. The final chapter, entitled Looking Backward, is an imaginative extract from the graduation dissertation of a Columbia juridical expert in 1947. By this device the author is able to point out the changes in legal procedure that he believes to be most urgently needed.

AGNES MATHILDE WERGELAND. *Slavery in Germanic Society During the Middle Ages.* Chicago: The University of Chicago Press, 1916. Pp. xvi, 158. $1.00.

In this little book we find a careful study of the sources relating to slavery in early and mediaeval Germany, the laws and customs determining the status of the slave, and the various ways in which the slave might regain his freedom. It is a very interesting and well wrought book.

ALBERT BENEDICT WOLFE, Editor. *Readings in Social Problems.* Boston: Ginn and Company, 1916. Pp. xiii, 804. $2.80.

The selections in this book deal with five types of social problems, as follows: Problems of population, of immigration, the woman problem, marriage and divorce, and the negro problem in the United States. In the first group Malthus' theory on the ratio of increase in population to food is presented, and there are extracts from various writers on the declining birth rate, socialism and population, eugenics, and infant mortality. Under immigration the im-

portant factors are the economic aspects of the problem, the assimilation of the immigrant, and various proposals for the regulation and restriction of immigration. Under the woman problem the selections deal with the development of the woman's rights movement and contemporary changes affecting the status of women and the education of women. The religious conception of marriage is contrasted with the civil idea of a social contract, and uniform divorce legislation is urged. It will be of great convenience to students to have all these selections brought together in a single volume.

FREDERIC LYMAN WELLS. *Mental Adjustments.* New York: D. Appleton and Company, 1917. Pp. xv, 331. $2.50.

Professor Joseph Jastrow, editor of The Conduct of Mind Series in which this book appears, writes in his introduction to it, "The reader will pursue the volume with two increasing convictions. The first is that the emotional life is far more central in human regulation than we are wont to recognize. By reason of the deeper rooting of the emotional life in the vital sources of energy, is its adjustment at once dependent upon the integrity of primitive satisfaction. It likewise pervades all derivative expressions of longing and satisfaction. Human nature as it transcends must also incorporate. The other conviction is similar to it: that beliefs, tendencies, inclinations, however intellectually expressed, are more complex than cold objective ideas. Optimism or pessimism is more a temperament than a conviction." The chapters deal with mental adaptation, use and waste in thought and conduct, symbolic association, the continuity of emotion, types of dissociation, mechanisms in dissociated ideas, experimental approaches, and balancing factors. The author makes frequent references to recent psychological investigations and masses his data to reinforce his argument in masterly fashion.